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CONTENTS

For Announcements, etc., see General Index

PAGE

ALLEN, GLOVER M. Second Preliminary Report on the Result of the Second Dolan Expedition to West China and Tibet. A New Race of Ochotona. Published October 25, 1937 341

CADBURY, JOHN W., 3RD. Lepidoptera Collected in Northern British Columbia by Miss Josephine de N. Henry. Part I.—Rhopalocera. Published January 6, 1938 387

COTTER, JOHN LAMBERT. The Occurrence of Flints and Extinct Animals in Pluvial Deposits near Clovis, New Mexico. Part IV.—Report on Excavation at the Gravel Pit, 1936. Published March 12, 1937 1

CRESSON, EZRA T., JR. Zoological Results of the George Vanderbilt African Expedition of 1934. Part VIII.—Lepidoptera Rhopalocera. Published November 5, 1937 369

DE SCHAUENSEE, RODOLPHE MEYER. First Preliminary Report on the Results of the Second Dolan Expedition to West China and Tibet. Two New Birds from Tibet. Published October 20, 1937 339

———— On a New Species of Drongo from Siam. Published October 20, 1937 337

DUNN, EMMETT REID. The Snake Genus Enulius Cope. Published January 14, 1938 415

FOWLER, HENRY W. A Collection of Haytian Fishes Obtained by Mr. Stanley Woodward. Published June 30, 1937 309

———— Notes on Fishes from the Gulf Stream and the New Jersey Coast. Published June 30, 1937 207

———— Zoological Results of the Third De Schauensee Siamese Expedition. Part VIII.—Fishes Obtained in 1936. Published May 19, 1937 125

LOVERIDGE, ARTHUR. Zoological Results of the George Vanderbilt African Expedition of 1934. Part VII.—Reptiles and Amphibians. Published June 22, 1937 265

PENNELL, FRANCIS W. Castilleja in the Charleston Mountains, Nevada. Published January 14, 1938 419

———— Taxonomy and Distribution of Aragoa and its Bearing on the Geological History of the Northern Andes. Published January 14, 1938 425

REHN, JAMES A. G. African and Malagasy Blattidae (Orthoptera).—Part III. Published May 5, 1937 17

———— A Second Study of New and Little-known Madagascar Grouse-locusts (Orthoptera, Acrididae, Acrydinae) with a Key to the Species of Thymochares. Published July 3, 1937 317

REHN, JAMES A. G. and JOHN W. H. REHN. Further Notes on the Genus Hemimerus (Dermaptera, Hemimerina, Hemimeridae). Published July 10, 1937 331

ROBERTS, H. RADCLYFFE. Studies on the Family Acrididae (Orthoptera) of Venezuela. Published November 5, 1937 343

SCHÄFER, ERNST. Third Preliminary Report on the Results of the Second Dolan Expedition to West China and Tibet. Four New Birds from Tibet. Published November 5, 1937 385

Abstracts of the Minutes of the Proceedings 433

Minutes of the International Symposium on Early Man, March 17-20, 1937 439

The Joseph Leidy Medal—Fifth Award 448

PROCEEDINGS
OF THE
ACADEMY OF NATURAL SCIENCES
OF
PHILADELPHIA

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THE OCCURRENCE OF FLINTS AND EXTINCT ANIMALS IN PLUVIAL DEPOSITS NEAR CLOVIS, NEW MEXICO. PART IV,—REPORT ON EXCAVATION AT THE GRAVEL PIT, 1936

BY JOHN LAMBERT COTTER

INTRODUCTION

The tendency to exaggerate the importance of archaeological discoveries becomes apparent to everyone who has followed such announcements through from the first glowing accounts on the subject in the press to the final, more conservative, report in some scientific publication, months and even years later In spite of the first astonishing accounts, the final conclusions, in most cases, add very little to what was already known It is the accumulation of little bits of evidence from many sources as time goes on which gives us a better picture of the problem before us

Thus it is with the work near Clovis, New Mexico Nobody realizes better than those of us who have taken part in these investigations that the results thus far, after more than three seasons of work in that region, have not added as much to the general knowledge of man's antiquity in North America as they have confirmed what other workers had already known or suspected It is, therefore, with these ideas in mind that the following report of John L Cotter has been prepared, setting forth the field work carried on during the summer of 1936 It is recognized that while certain new evidence was obtained, dealing with the association of extinct animals and man-made objects of stone and bone, one of the chief results lies in the definite confirmation of evidence submitted by earlier investigators of this particular problem. One of the earliest of these was Koch who reported in 1839 the finding of mastodon remains associated with stone points. Of the more recent announcements of an association somewhat similar to that near Clovis is that from Dent, Colorado, reported upon by J D Figgins in 1933.

Previous reports have dealt with the work at the gravel pit and surrounding regions between Clovis and Portales The present report brings the results up to date Mr Cotter, who has kindly undertaken to write it, is well fitted to do so Since his first interest in the Folsom problem he has devoted almost continuous study to the typology and distribution of Folsom and Yuma points, first under Professor E B Renaud at the University of Denver, later under J D Figgins at the Colorado Museum of Natural History, and, in field work, at the Lindenmeier site in Colorado under Mr Figgins, with me at Clovis during the past summer, and with Dr Frank H H Roberts, Jr, of the Smithsonian Institution, at the Lindenmeier site again at the end of the summer It is expected that the work will be continued during the coming summer with the hope of adding another bit of evidence that will help to piece together the picture of man's antiquity in the New World

Acknowledgment for the support of the 1936 project at Clovis is due to the Carnegie Institution of Washington, and The University Museum of Philadelphia, for co-operating with the Academy of Natural Sciences of Philadelphia, and to Mrs John Penn Brock, and Mrs Lincoln Godfrey, Jr of Philadelphia

EDGAR B HOWARD

The site known as "the gravel pit" is situated in Blackwater Draw, between Portales and Clovis, New Mexico, west of U S Highway 70 The exact location is the southeast corner of the southwest quarter of Section 25, Township I N, Range 34 E

Work done previously at this site has been fully described by Howard,[1] Howard and Antevs,[2] and Stock and Bode[3] Following a preliminary inspection of the gravel pit, which was found to have undergone considerable erosion along the walls and filling, the party, led by Dr Howard, began work July 1, 1936 It was first thought advisable to examine the margins of the pit thoroughly for traces of skeletal remains and artifacts possibly exposed by recent weathering At the same time a test trench was begun on top of the dump situated at the southeast corner of the large rectangular excavation (150 x 250 ft, approx)

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[1] Howard, E B Evidence of Early Man in North America The University Museum Journal, Vol XXIV, Numbers 2-3 Phila, 1935

[2] Howard, E B and E Antevs The Occurrence of Flints and Extinct Animals in Pluvial Desposits near Clovis, New Mexico Part I, Introduction (Howard), Part II, Age of the Clovis lake clays (Antevs) Proc Acad Natural Sciences of Phila, Vol LXXXVII, 1935, pp 299-312

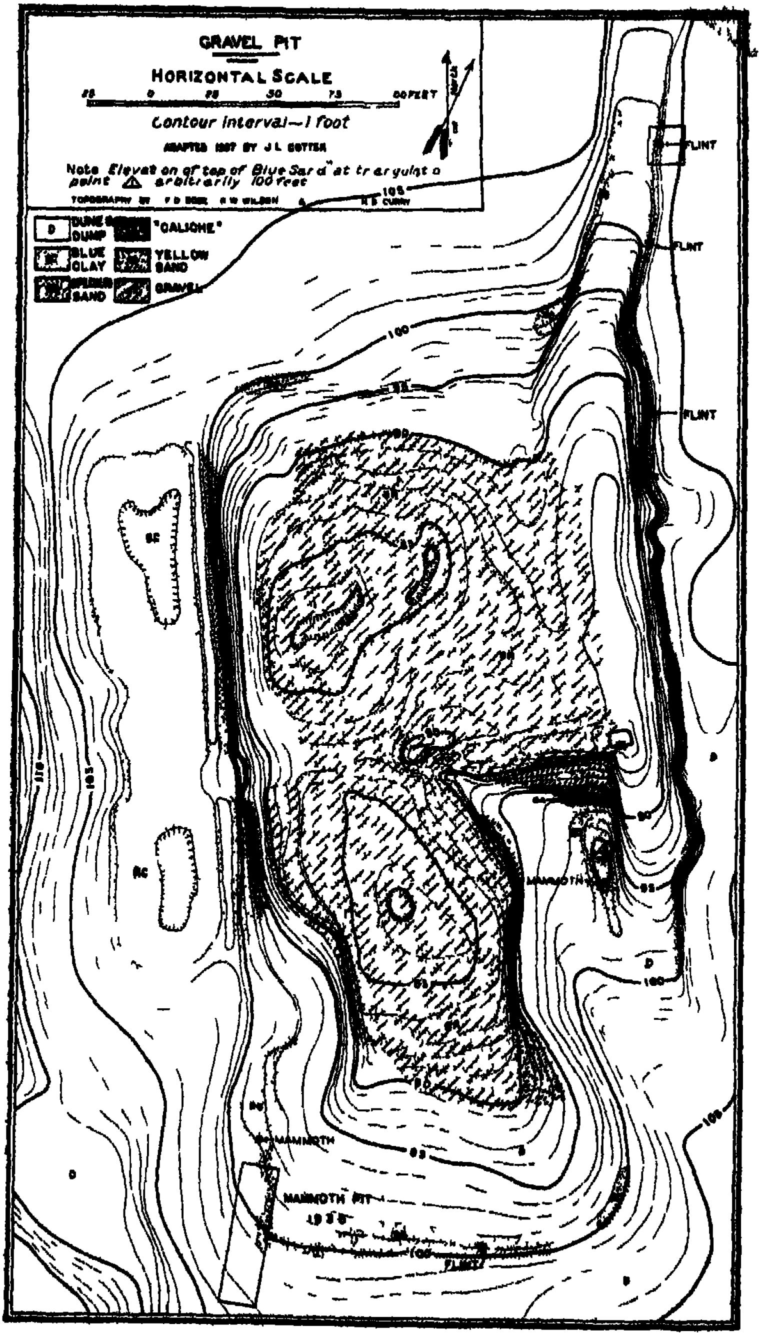
[3] Stock, C and F D Bode The Occurrence of Flints and Extinct Animals in Pluvial Deposits near Clovis, New Mexico Part III, Geology and vertebrate paleontology of the later Quaternary near Clovis, New Mexico Proc Acad Nat Sciences of Phila, Vol LXXXVIII, 1936, pp 219-241

[illegible]mination of the tops of the dumps surrounding the pit resulted [illegible] recovery of a fine Folsom point (Pl 1, fig 2), the base of which was broken. This point lay exposed on silty clay material obviously derived from the " blue " stratum of the pit, and it was near this find, in the same type of material, that a test trench was begun Scarcely an hour's work, sifting with a half-inch screen, netted a perfect Folsom point (Pl 1, fig 3) No more flint was found in the trench, which was continued to a depth of three feet and a length of twelve feet, thus transecting the blue portion of the dump Although prospects were thus found to be excellent for recovering specimens of lithic industry by working the dump wherever the blue earth was available, it was thought expedient to concentrate efforts upon locating evidence in undisturbed portions of the blue stratum about the periphery of the pit (Text plate 1 shows a section of the pit walls)

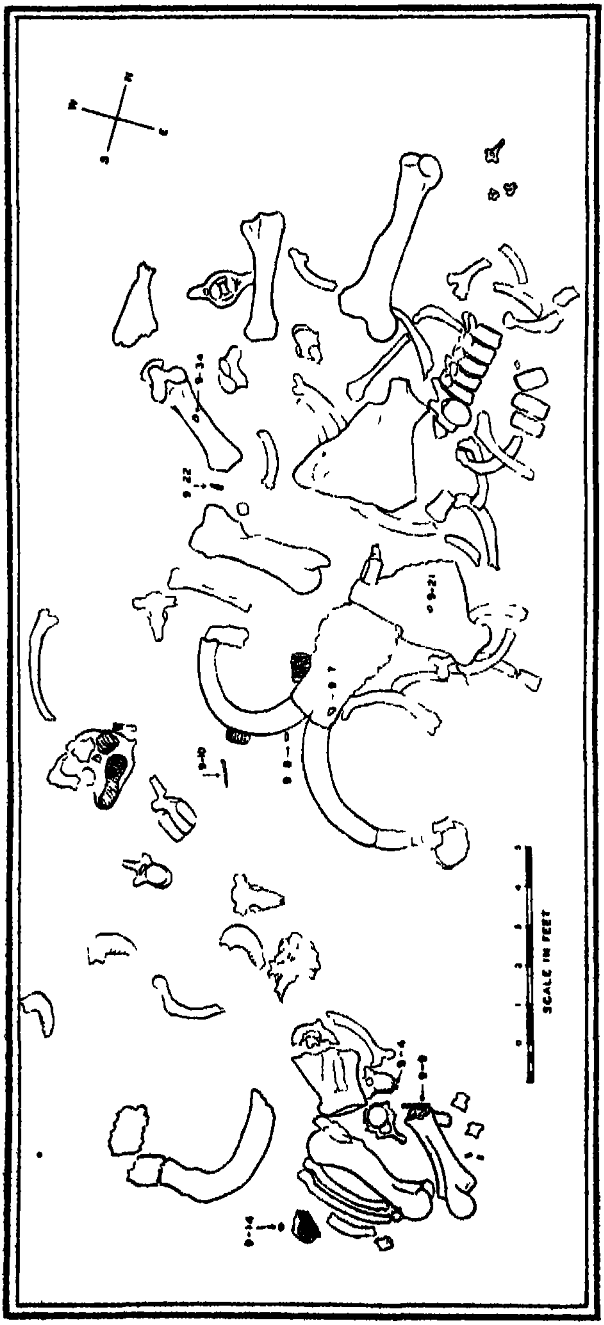
Accordingly the sides of the pit where sections of blue material and the underlying caliche and sand were exposed were carefully observed The following day, July 2, Dr Howard located the cervical vertebra of a mammoth which lay partly exposed by erosion in the southwest corner of the pit In the process of recovering this specimen, a second vertebra and an ulna (the distal end of which was badly damaged) also of mammoth, were disclosed At this time, the entire Clovis party, consisting of Alexander B Brock, Lincoln Godfrey, Malcolm Bull, and John L Cotter, set to work under Dr Howard's direction to prepare the bones thus exposed, and to determine if more evidence were present

Work of freeing the second vertebra from the silty bluish clay disclosed that the mammoth bones rested directly on top of a deposit of fine speckled sand *It was in this sand, one inch beneath the top contact with the bluish clay and one inch beneath this vertebra, that the first artifact was found, a lanceolate point of dark-gray chalcedony*, 95 mm long and 30 mm wide (max), distinguished by large flaking modified by marginal retouch, and by incipient grooving extending up from the base, 20 mm on one side, 30 mm on the other This grooving was in the style of the "*channel*" or "*fluting*" of the true Folsom point, but did not extend far, or modify greatly, the original lens-shaped cross section By sighting horizontally to the bank, where the bluish clay was still intact, it was estimated that the point was situated approximately two and one-half feet below the top of the blue stratum

As work progressed, three carpals, a metacarpal, a humerus, and part of a scapula, all of mammoth, were also uncovered within a radius of five feet from the point. Each of these bones was located resting on the bottom contact of the bluish clay, and none extended into the underlying speckled sand more than two inches Above the mammoth bones, as excavation progressed into the bank proper, bison bones were noted in profusion occu-



Text-Plate 1 — Gravel Pit



Text-Plate 2 — Mammoth Pit as Seen from Above pying a fairly uniform position in the bluish clay directly above the mammoth bones, and occasionally lying in contact with the upper surfaces of the latter The bison bones, which were in a rather fragile state, extended into the speckled sand in only two instances

After this cluster of mammoth bones was uncovered, an area 15 feet by 32 feet was laid off, and a systematic effort was begun to uncover the skeletal material which was now recognized as extending westward and northward well into the bank of the gravel pit

Excavation soon revealed a tusk, traces of a cranium, a molar, several foot bones, and three ribs, associated with the other mammoth bones originally located, so as to indicate strongly that the collection represented a single animal This conjecture was further strengthened by the discovery of a second mammoth cranium, with upper jaw and two large tusks intact, some five feet north of the location of the original artifact The tusks and jaw lay mainly in the silty bluish clay, extending into the speckled sand beneath a maximum of four inches

First traces of the second mammoth soon led to the finding of further evidence of the presence of man A large sub-triangular flake scraper, well worked on the broadest edge, lay three inches above the sheath of the left tusk in silty blue clay The artifact was seven inches above the upper contact of the speckled sand (See Text illus) Shortly afterward the removal of material from between the tusks revealed an elongated flake with lateral retouching, which lay three inches below the bottom contact of the blue clay in speckled sand (Plate 3, fig 3)

This artifact was viewed in situ by Dr Frederica de Laguna and her mother, Dr Grace A de Laguna, who visited the site several times and participated in the work Dr de Laguna located the left scapula of the second mammoth, immediately behind the head, and lying on the speckled sand The finder also discovered an unworked flint chip four inches above the scapula, in close association with some fragmentary bison bones The artifact between the mammoth tusks was also seen in place by Dr Ernst Antevs and Dr Harold S Colton, who visited the gravel pit at this time

Enough bone material had been uncovered by now to necessitate preparation for removal Accordingly the first set of long bones, the semi-articulated humerus and ulna of Mammoth 1, were capped with stiffened burlap As the underlying sand was being worked away to permit turning the ulna, the first bone artifact was revealed lying horizontally one inch below the damaged distal end of this bone, and half an inch above, and to the side of, a metacarpal Plate 5, fig 2 shows ulna set before discovery of bone artifact, Plate 6, fig 1 shows artifact in situ, Plate 7, artifact, detailed view The distance of this bone artifact from the original Folsom-like artifact was ten inches, the former lying six inches below the bottom

of the bluish clay in speckled sand (See Text-plate 2, Diagram of
The bone artifact, measuring 25 mm long, and 15 mm in diameter at the thicker end, was left in situ and later removed, undisturbed, with the ulna and foot bone, the matrix of sand around them being hardened with shellac, and the resulting block being enclosed in a plaster sheath

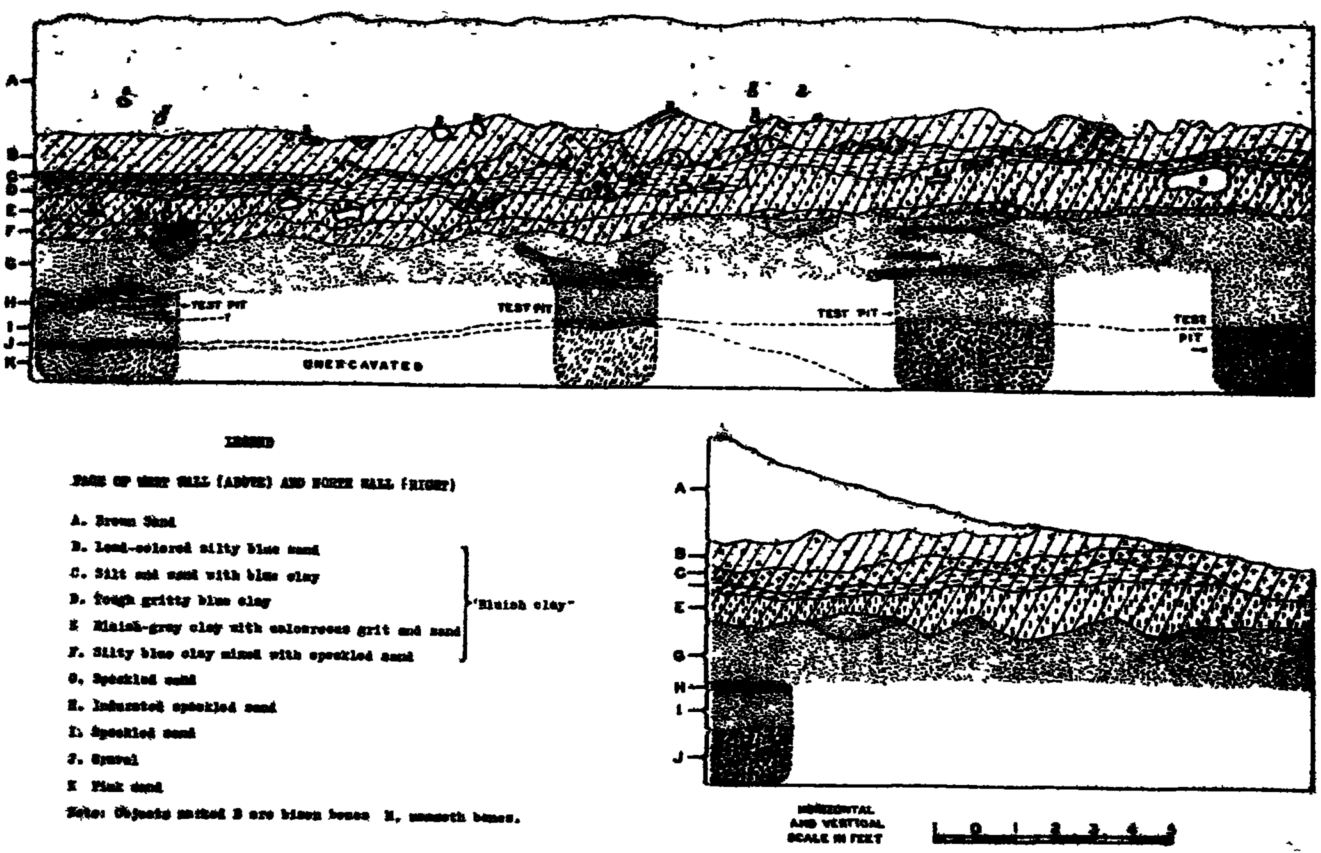
Shortly afterward a second bone artifact corresponding to the first in general, but differing in one important aspect, as we shall discuss later, was located in situ eleven inches south of the right tusk of Mammoth 2 and seven inches below the bottom contact of the blue clay, in speckled sand (Plate 2)

Excavation northward in the area designated soon revealed more of the second mammoth skeleton Behind the scapula and head lay a cluster of ribs, a set of three articulated thoracic vertebrae, and a set of five articulated thoracic vertebrae Four feet to the west of the five vertebrae and also behind the head of the second mammoth, a complete right femur lay three quarters in the bluish material, extending into the speckled sand to a depth of three inches Another set of two articulated vertebrae was found later near the first two sets In the process of cleaning the set of three vertebrae, an unworked chalcedony flake was located directly above the center unit in bluish clay

As work progressed north, and the overlying bison debris in the upper portion of the blue material was removed, a tibia, an atlas, and an ulna of the second mammoth were uncovered A partially worked flake was found six inches above the center of the ulna The ulna was one of the few mammoth bones which lay almost entirely in the speckled sand, with the upper surface on the contact with the bluish clay The worked flake was six inches above this contact in the clay, and lay five inches below a bison foot fragment Two more flakes were also located in the vicinity of Mammoth 1 The first, of reddish chalcedony, was not retouched This flake lay 24 inches west of the distal end of Mammoth 1 tusk, in sand three inches beneath the contact with the bluish clay, and three and a half inches below and seven inches west of the proximal end of a bison scapula The second, a gray chalcedony flake with one edge worked, appeared 31 inches south of the middle of Mammoth 1 tusk, and three inches in the speckled sand

A second entire chalcedony point was located in situ between the distal end of the Mammoth 2 ulna and the proximal end of the humerus, beside which lay the radius The point lay in speckled sand one inch from the contact with the blue clay, and four inches from the ulna and humerus respectively (Plate 3, fig 1 and Text illust)

At this time the bones and artifacts then exposed in situ were seen by numerous visitors, including Dr C Stuart Johnston and Mrs Johnston,



LEGEND

FACE OF WEST WALL (ABOVE) AND NORTH WALL (RIGHT)

A. Brown Sand
B. Lead-colored silty blue sand
C. Silt and sand with blue clay
D. Tough gritty blue clay
E Bluish-gray clay with calcareous grit and sand
F. Silty blue clay mixed with speckled sand
G. Speckled sand
H. Indurated speckled sand
I. Speckled sand
J. Gravel
K Pink sand

"Bluish clay" (B–F)

Note: Objects marked B are bison bones M, mammoth bones.

Text-Plate 3

Savage, of Canyon, Texas, and Mr. Floyd V Studer of Amarillo,

The last artifact uncovered in position was located directly below the left scapula of Mammoth 2 during the process of undercutting for the removal of the bone. This artifact, a center fragment of a point of gray chalcedony, was measured in situ before removal, and was found to be one inch below the middle portion, proximal side, in speckled sand The scapula lay in a horizontal position approximately on the contact of the bluish clay and speckled sand, so that the point fragment lay three inches below this contact

Two more important finds were made as the mammoth bones were removed to reveal the sand beneath The first was a large bison scapula, which lay thirteen inches below the clay-sand contact, just north of the ulna of the second mammoth The second was a horse cannon bone, badly rodent-gnawed, which lay five inches under the Mammoth 2 lower jaw, and thirteen inches beneath the clay-sand contact A bison foot bone, located eight inches above this contact, and directly above the same mammoth jaw, completed a clearly representative sequence of occurrence Fifteen inches northwest of Mammoth 2 right tusk and thirteen inches below the contact of the blue clay and speckled sand, two horse teeth were found At this point the deeper gravel was found to lie eighteen inches below the horse teeth

When all bones were removed from the pit, a final precaution was taken of sifting the remaining undisturbed speckled sand This resulted in the recovery of a complete, relatively crude, point of reddish chalcedony (Plate 4, fig 4) It was estimated that this artifact must have come from a depth of not less than a foot beneath the bluish clay Some six chalcedony artifacts found on the surface of the dumps surrounding the pit complete the lithic finds made at this site These specimens will be mentioned later in the summary of artifacts

Final work was greatly facilitated by the arrival of Mr C T R Bohannan and Mr. R M Burnet from Carlsbad, where they had been engaged in reconnaissance in the Guadalupe Mountains under Dr Howard's direction. Preliminary excavation by Mr Burnet at the northeast corner of the gravel pit laid the groundwork for future efforts in this locality

BRIEF REVIEW OF GEOLOGICAL AND PALEONTOLOGICAL EVIDENCE

We have seen from the foregoing account that, in general, the stratigraphy of the mammoth pit is characterized by the occurrence of three more or less distinct layers aggregating approximately seven feet first, a brownish dune sand extending down two and a half feet from the surface; second, a bluish material containing sand, grit, and clay, representing an average thickness of three feet, and third, a speckled sand layer averaging one and a half feet in thickness and extending to a depth of seven feet Beneath the speckled sand an increasingly coarse gravel ranges to an undetermined depth These deposits are illustrated in the diagrams of the west and north walls, seen in Text-plate 3 It will be further noted here that bands of indurated sand of a darker color occurred in the speckled sand Analyses of the bluish clay material and the speckled sand are furnished through the courtesy of A W Postel, of the Department of Geology of the University of Pennsylvania These analyses demonstrate the fact that the bluish material contains much of the speckled sand itself, the color being accounted for to some extent by the added presence of carbonized vegetal material Thus there remains a close affinity between the bluish material and the speckled sand, as opposed to the marked difference between the bluish material and the caliche, which underlies the former in other parts of the pit and does not bear fossil material The analyses follow

Blue Clay

Tourmaline brown (common), violet and green (rare)
Epidote (Medium)
Hornblende, green, brown (very common)
Pink garnet (common)
Zircon (rare)
Apatite (rare)

Speckled Sand

Tourmaline, brown
Pink Garnet
Apatite
Zircon
Epidote
Hornblende, brown, green (very rare)

With striking, though not quite absolute uniformity, a relatively dense debris of bison bones, occasionally articulated, but usually scattered and in poor state of preservation, occupies the upper two-thirds of the bluish clay layer, and ranges as much as a foot and a half into the overlying brownish sand Only two instances of bison bones lying in speckled sand were observed These bones lay eight inches and thirteen inches respectively below the top contact of this sand with the bluish material

The lower third of the bluish clay material was found to contain, characteristically, the upper portions of mammoth bones, which lay with an average of one-third of their bulk in the underlying speckled sand Occasionally a mammoth bone lay entirely in the speckled sand immediately beneath the contact the speckled sand proper several horse bones occurred at an average th of thirteen inches below the top contact with the bluish clay These bones, while probably all of the same species, varied in size Turtle carapace fragments also appeared characteristically in the speckled sand at this depth

The following is a list of vertebrates represented at the mammoth pit

Parelephas? cf *columbi* (Falconer)
Bison, extinct species or subspecies
Equus, extinct species
Cervus, species indet
Rodent, species indet
Terrapene ornata Agassiz

ARCHEOLOGICAL EVIDENCE

The following is a summary list of artifacts and lithic flakes recovered from (1) the mammoth pit and (2) the dumps of the gravel pit proper Initial serial numbers correspond with those plotted on the pit diagram, Text-plate 2 All artifacts are illustrated natural size

The paleontological material and artifact 9–9 are now part of the Clovis collections of The Academy of Natural Sciences of Philadelphia, the remainder of the artifacts has been added to the collection of lithic finds from Clovis at The University Museum of Philadelphia

Mammoth pit artifacts disclosed in situ

9–7 Sub-triangular flake retouched as side scraper, gray chalcedony Located in bluish clay seven inches above contact with speckled sand, three inches above left tusk sheath of Mammoth 2 (Plate 6, fig 2, and Text illust p 12)

9–4 Complete Folsom-like point, gray chalcedony Located in speckled sand one inch below contact with bluish clay and two inches beneath ventral border of Mammoth 1 vertebra (Plate 3, fig 2 and Text illust p 12)

9–22 Complete Folsom-like point, gray chalcedony Located in speckled sand one inch below contact with bluish clay and between Mammoth 2 ulna, distal end, and humerus, proximal end, four inches from each bone respectively (Plate 3, fig 1 and Text illust p 12)

9–21 Center fragment of a point, gray chalcedony Located in speckled sand one inch below ventral surface of Mammoth 2 left scapula, approximately three inches below the top contact of the speckled sand (Plate 3, fig 4)

9–9 Bone artifact, located in speckled sand six inches below top contact, one inch below distal end of Mammoth 1 ulna, small end of artifact extending five inches from phalanx Artifact ten inches from first Folsom-like point (Plate 6, fig 1, Plate 7)

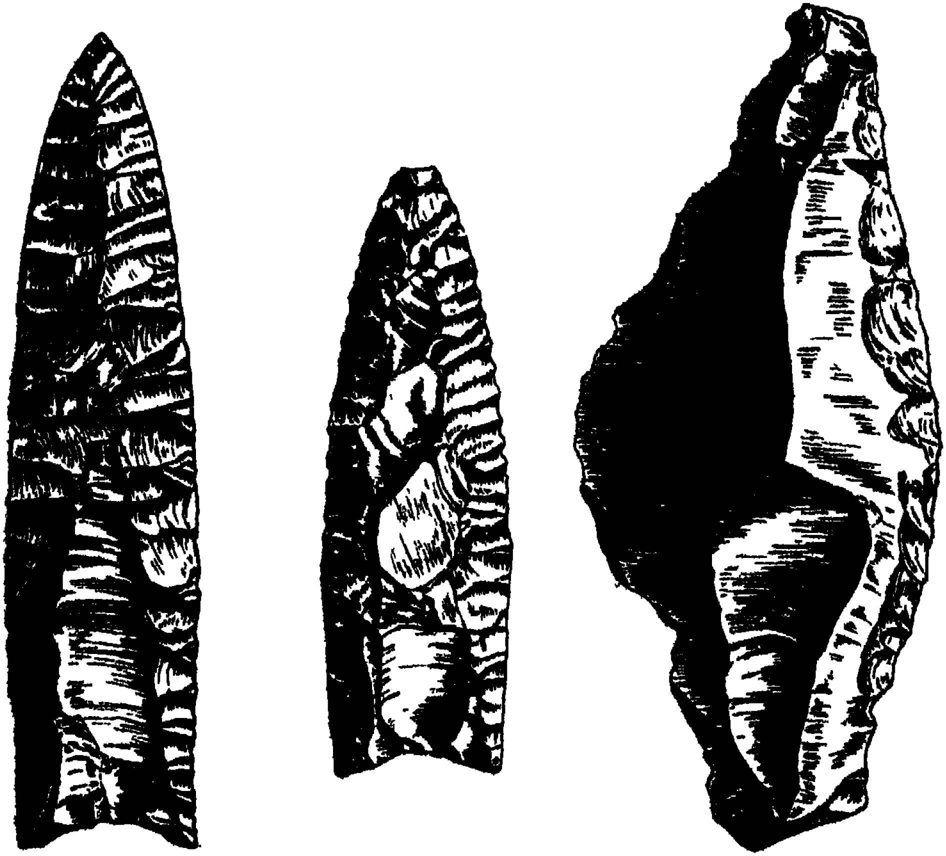
9–10 Bone artifact, located in speckled sand seven inches below top contact, eleven inches south of Mammoth 2 right tusk (Plate 2, Plate 5, fig. 3)

9–8 Retouched flake, gray chalcedony Located in speckled sand three inches below top contact, between tusks of Mammoth 2, one inch from tusk sheath (Plate 3, fig 3)

9–27 Flake, unworked, reddish chalcedony Located in speckled [illegible] three inches from top contact, three and a half inches below bison scap

9–14 Flake, worked, gray chalcedony Located in speckled sand three inches from top contact, near mammoth 1 tooth

9–34 Worked flake, possibly used as scraper Located in blue clay six inches above bottom contact with speckled sand, and six inches above center of mammoth 2 ulna



Text Illustration —Two Folsom-like Points and Side Scraper Associated with Mammoth Bones at Gravel Pit The Smaller Point was Associated with Mammoth 1, the Larger Point with Mammoth 2

9–26 Flake of chalcedony, light gray, located with set of three articulated mammoth 2 vertebrae In speckled sand two inches below top contact

9–33 Not in situ· Ungrooved point of lanceolate shape and relatively crude flaking, reddish chalcedony Located one foot or more in speckled sand below top contact with clay, near mammoth 2 left scapula (estimate) (Plate 4, fig 4) *facts located in situ in rain-eroded portions of bluish clay in* *of gravel pit* (see diagram of gravel pit, Text-plate 1)

9–16 Tip of point, no groove apparent, gray quartzite Located in surface of bluish clay in south bank of gravel pit

9–15 Fragment of pointed, double-edged side scraper on a flake (Plate 4, fig 1)

Lithic artifacts located in or on surface of dumps surrounding gravel pit

9–12 Complete Yuma blade of type distinctive of Clovis Lake beds Mottled reddish chalcedony (Plate 4, fig 2)
9–17 Complete true Folsom point, gray chalcedony (Plate 1, fig 1)
9–23 Complete small ("midget") Folsom point, gray chalcedony (Plate 4, fig 5)
9–18 Complete true Folsom point, gray chalcedony (Plate 1, fig 4).
9–1 True Folsom point, gray chalcedony (Plate 1, fig 2 Reverse side has short groove)
9–29 Flake side scraper Brown quartzite
9–28 Tip portion of knife blade Speckled gray chalcedony
9–30 Tip of point, reddish chert
9–32 End fragment of side scraper, reddish-tan quartzite

From the accompanying illustrations it will be seen that the first observation as to typology is that the two chalcedony points located in association with the mammoth are specifically Folsom-like as determined by their short, superficial grooves, the relative boldness of flaking, and the ground basal edges The fragmentary third point, located beneath the scapula of the second mammoth, while lacking the basal portion, gives noticeable indication of having been of the same type as the first two points. The fourth point, located in the speckled sand beneath the mammoth deposits, is certainly relatively cruder, completely lacking a groove, although the lateral basal edges are ground

It is important to note that points have been found associated with bison in previous years at other nearby sites

On the dumps surrounding the gravel pit, however, where the blue material was piled up by the road companies, points were recovered which are of the finest "classic" Folsom design, with grooves extending from one half to almost the entire length of the point from the base These points range, as do the Folsom points from the type site near Folsom, New Mexico, from blades with maximum breadth pointward of the middle to true lanceolate shape (maximum breadth baseward of the middle) All of these points have characteristic grinding of the basal edges A single "midget" Folsom, located on the west dump, is illustrated on Plate 4, fig 5 In this location was also found another type of point, possibly a knife blade, which is illustrated on Plate 4, fig. 2 This type is as typical of the Clovis erosion basin occurrences as are the true Folsom and Folsom-like points, and is represented by several specimens previously recovered in the region by Dr Howard, as well as many in collections made from the Clovis district

This year a side scraper of triangular form was located in near association with the second mammoth in the main excavation This scraper, of light gray chalcedony, was the only artifact which lay in the blue clay material at the mammoth pit (with the exception of a slightly worked chalcedony flake, 9–34) A fragment of a large double-edged side scraper and the tip of a knife or a point, both of chalcedony were, however, located in bluish clay deposits along the banks of the gravel pit Although these last two artifacts were not excavated, they were unmistakably in situ when discovered, partially exposed by rain erosion Both scrapers are of the large flake type with retouched edges, and are not distinguishable from types familiar to historic Indians

The bone artifacts both occurred in the speckled sand The first was closely associated with the distal end of the ulna and a phalanx of the foreleg of the first mammoth This artifact was left in situ and removed in the block containing the ulna and foot bones, and the matrix in which they were embedded In the laboratory at The Academy of Natural Sciences the artifact was left in position, but was freed from the adhering sand sufficiently to determine its shape (Plate 7) The artifact was seen to be a cylindrical shaft of bone, 252 mm long and 15 mm in diameter at the thicker end, beveled at both extremities Striations are indicated on both bevels, although these are less distinct at the thicker end, which was found damaged. The second bone artifact (Plate 2) is 234 mm long, and 17 mm in maximum diameter This specimen is likewise cylindrical in shape, tapers, and has a well-defined bevel marked with oblique transverse cuts or scratches It differs, however, in that it has only a very slight bevel at the tapering end, which shows no scratches The surface of this bone artifact is smooth except for a few faint scratches running transversely which occur towards the bevel

CONCLUSIONS AND DISCUSSION

The following facts seem paramount as we view the evidence gained during the past season's excavation at the Clovis gravel pit

1 Deposits of bluish sandy clay, together with a speckled sand, which is one of the constituents of the former, bear certain bone remains of extinct animals with which are associated two Folsom-like points, a fragmentary point, a scraper, and several flakes, all of chalcedony, and two bone artifacts The occurrence of these bones resolves itself into certain characteristics the bison bones, except for a cannon bone and a scapula, occurred in the blue material immediately above the mammoth The mammoth bones occupied the contact of the blue material and the speckled sand beneath Below the mammoth bones, horse bones and traces of turtle shells occurred in the speckled sand at a depth of thirteen inches from the

[illegible] the bluish material. Of the stone and bone artifacts only the scraper and a slightly retouched chalcedony flake occurred in the blue material, the rest lying in speckled sand

2 That the lithic and bone artifacts at the excavation were in definite association with, and thus contemporaneous with, the mammoth bones, if not the bison, horse and other bones, is unmistakably demonstrated by the evidence On the whole there is nothing to indicate in the stratigraphy that there is any marked difference in the ages of the bison, mammoth, and horse bones, although there is a distinct tendency toward a relative sequence in the occurrence of these three species, as we have described What Antevs has noted in the summary and conclusions of his discussion, "Age of the Clovis Lake Clays"[1] seems entirely applicable to the deposits of the mammoth pit

From an anthropological standpoint, the artifact finds would seem to merit some discussion The two chalcedony points characterized by bold flaking and incipient grooving from the base correspond specifically to the type of artifact described by Howard[1] and termed Folsom-like From the aspect of typology these Folsom-like points are related to the points of true Folsom design in the Clovis erosion beds, i e those points which correspond in design to the specimens from the Folsom type site That these particular Folsom-like points bear a definite cultural relation to the Folsom points is strongly indicated by the fact that several true Folsoms have been recovered from the blue clay material excavated from the gravel pit proper Since it is impossible to determine, however, whether these Folsom points came from the upper or lower portions of the blue material, or whether they were once associated with bison, mammoth, or other bones, we are forced to preclude as yet anything more than an implied relationship

On the other hand, the complete ungrooved chalcedony point and the two bone pieces bear a specific relation to the two Folsom-like points, having all been found in the speckled sand, more or less in close association with the mammoth bones The contemporaneity of the deposition of these artifacts cannot be doubted

The tapering, cylindrical, bone artifacts with beveled ends present a type of craftsmanship in boneworking not hitherto associated with Folsom industries as represented in recorded sites That the beveled ends with cross striation on the surfaces were fitted to the beveled ends of other shafts and lashed, can be safely assumed This technique of splicing shafts and foreshafts was known to Indians of North America and Eskimos alike The literature of Eskimo material culture is too voluminous for citations here of the well-known fact that sites throughout the Esk[illegible] area from northeast Greenland to western Alaska yield foreshafts [illegible] shaft parts cut obliquely at the ends for splicing These cut ends [illegible]ally show transverse lines created either purposely or in the p[illegible] cutting It is interesting to note concerning the Clovis bone artifacts [illegible] the first is beveled at both ends The second artifact has a definite bevel only at one end, giving rise to the possibility that the piece may itself have been employed as a lance head, or even to accommodate a toggle in which a point was mounted. From the evidence of these two bone implements it may at least be implied that shafts employed by the makers of Folsom-like points at Clovis were made of more than one piece

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[1] The Occurrence of Flints and Extinct Animals in Pluvial Deposits near Clovis, New Mexico, Part II, Proc of Acad of Natural Sciences of Philadelphia, Vol LXXXVII, 1935, pp 299-313

AFRICAN AND MALAGASY BLATTIDAE (ORTHOPTERA),—PART III

BY JAMES A G REHN.

The prefatory remarks to Part I of these studies[1] gave the reasons for their presentation, and the student is referred to this earlier contribution for my general acknowledgments and similar comments, as well as to Part II of the series which appeared in 1933[2]

The present part is made up of six major sections, comprising in the subfamily Pseudomopinae the description of a new genus (*Namablatta*) and a study of the species of the genus *Euandroblatta*, in the Panchlorinae preliminary revisions of the species of the genera *Leucophaea*, *Nauphoeta* and *Stilpnoblatta*, and in the Perisphaerinae a study of the species of the genus *Agis*, and of the members of the African subgenus *Fanoblatta* of the otherwise Oriental genus *Pseudoglomeris* In addition distributional data have been assembled on the African species of *Panchlora* and on the genera *Pronauphoeta* and *Isoniscus*

The new entities described in the present part are one new genus, twenty new species and one new subspecies In addition to the illustration of these, I have been able to present figures of certain previously known species which have remained unfigured for many years, and several of which have in the meantime accumulated extensive synonymies, the true relationships of which are here presented for the first time

I am indebted to Dr B P Uvarov, of the Imperial Institute of Entomology, for invaluable help in the comparison of material with certain of Walker's types This has given to the nomenclature used in certain of the present studies greater authority and permanency

PSEUDOMOPINAE

A New Genus from Austral Africa

NAMABLATTA,[3] new genus

Allied to *Supella* Shelford, agreeing in the general form of the head, palpal proportions, pronotal form, character and disposition of the tegminal and alar veins in the male, in the general development of the male abdomen and in the equal, marginally unspecialized tarsal claws The new genus, however, differs chiefly in the armament of the ventro-cephalic margin of the cephalic femora being of Type B, i e those proximad of distal group being piliform, while this series of *Supella* is of Type A, or with equally robust spines decreasing in length and size distad to apical group. In the female the tegmina are very brief, transverse, lateral and lamellate, no longer than the mesonotum, while the wings are lacking In *Supella* females the tegmina and wings are fully developed but abbreviate

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[1] Proc Acad Nat Sci Phila, LXXXIII, pp 305-387, pls 31-35, (1931)

[2] Idem, LXXXIV, pp 405-511, pls 30-33, (1933)

[3] In allusion to its occurrence in the land of the Namas

Generic Characters—Fully alate in the male; tegmina in female brief, lateral, lamellate, non-functional, wings absent in female. Form elongate, slender in male, short, subelliptical in female Head pyriform in outline, eyes broadly separated at occiput, inter-ocellar area with a slight (♀) to distinct (♂) transverse, rounded subangulation passing from occiput to face, palpi slender, elongate Pronotum of male in outline subtrapezoidal, distinctly narrowing cephalad, caudal width little greater than length, disk subdeplanate, caudad with a pair of converging sulci, joined near the weakly arcuate caudal margin by a transverse connected sulcus, pronotum of female transverse, semicircular in outline, caudal margin subtruncate; disk without sulci Tegmina of male narrow, markedly surpassing apex of abdomen, apex rounded, marginal field very narrow, discoidal sectors oblique, anal field elongate pyriform Wings of male with slight and narrow intercalated triangle present, costal veins subincrassate distad, discoidal vein entire; ulnar vein with complete rami Tegmina of female no longer than mesonotum, lateral, widely separated, truncate distad, with definitely indicated venation elements Wings absent in female Dorsum of abdomen of male with seventh tergite having glandular specialization mesad, ultimate tergite (supra-anal plate) transverse trigonal, ultimate sternite (subgenital plate) of male trigonal, acute, with symmetrical disposed styles Abdomen of female broad, deplanate dorsad Cephalic femora with ventro-cephalic margin armed proximo-mesad with a group of large spines, followed abruptly by a series of very short, subpiliform spinules and a distal (apical) group of two large spines Caudal tarsi with metatarsus longer than other articles combined, all articles with apical pulvilli Tarsal claws equal in length, margins simple, arolia present

Genotype —*Blatta bitaeniata* Stål

This strikingly beautiful, and in the male graceful, genus is apparently limited in its distribution to the more arid portions of southwestern Africa. Its relationship to *Supella* is close and their common origin seems evident It would appear to me that this relationship, and the apparently circumscribed distribution of *Namablatta*, is additional evidence pointing to the probable African origin of the now widely distributed *Supella*.

Namablatta bitaeniata (Stål) Plate 8, figs 1-5

1858 *Blatta bitaeniata* Stål, Öfv Kongl Vetensk-Akad Forh, XV, p 308 [♂, near Swakop River (Southwest Africa)]

BECHUANALAND PROTECTORATE· Gemsbok Pan, Kalahari, April 23 to May 5, 1930, (Vernay-Lang Expedition), one male, [Transvaal Museum]

SOUTHWEST AFRICA Namutoni District, near Etosha Pan, Damaraland, July 9-11, 1930, (De Schauensee Expedition), one female;[4] [A N.S P].

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[4] Here selected as allotype

Okahandya, March 2 to 18, 1928, (R E. Turner); one male, [Brit Mus. Nat Hist.]. Pomona Island, October, 1925, one male, [A.M N.H].

Cape Province Henkries, Bushmanland, October, 1911; (Lightfoot), one male, [So Afr Mus] Pella, Bushmanland, (G Alston), one male; [So Afr Mus] Jackal Water, Bushmanland, October, 1911, (Lightfoot), one female, [So Afr. Mus] Ookiep, Bushmanland, October 17, 1885; (L Peringuey), one female, [So Afr Mus] November 20, 1885, one male, [Geneva Mus] (L Peringuey), one male, [U S N M] Van Wyk's Vley, Carnarvon District, 1893, (Alston), one female, [So Afr Mus] "Cape of Good Hope", one male, [Geneva Mus]

No data one female, [So Afr Mus]

This species is known in the literature only from its brief original diagnosis, based almost solely on the more evident color features, and a subsequent supplementary description, apparently of the original male material, by Stål[5] Bolivar has recorded the species from Assinie, West Africa,[6] without comment, but this, I am certain, is an erroneous determination, as the species is one peculiar to extreme desert conditions It is essential for future workers that the species be redescribed in a modern fashion, and that the previously undescribed, very different looking female be characterized I am therefore briefly summarizing the features of the male, from the Gemsbok Pan individual, and designating an allotype

Male Head with greatest width across eyes equal to four-fifths of greatest depth of head (as 44 to 55), lateral borders of ventral portion of head acutely oblique convergent to buccal region, interspace between eyes at occiput slightly broader than that between internal margin of antennal scrobes (as 14 to 13), ocellar spots marked sublunate in shape, encompassing dorsal border of antennal scrobes, facing ventro-laterad, area between same in profile rounded obtuse-angulate, definite but without transverse carina, palpi with proportions of three distal articles, reading proximad, as follows, 16, 19 and 18, ultimate article elongate subsecuriform, penultimate elongate infundibuliform, antepenultimate subcylindrical, faintly enlarging distad.

Pronotum with greatest length contained slightly more than one and one-fourth times in greatest width, which is at caudal third, cephalic margin moderately arcuate, broadly rounding into the weakly arcuate, caudad obliquely diverging lateral margins, which narrowly round over the point of greatest width to short, oblique, caudad converging, arcuate sections, passing regularly into the relatively broad, gently arcuate caudal margin· hyaline lateral sections as a whole weakly impressed, so that surface contour is subdepressed below that of colored disk, area of the lateral margins weakly and narrowly recurved

Tegmina surpassing apex of abdomen by about two-fifths of their length, greatest width, which is at distal third, contained three and two-fifth times in greatest length of same, apex narrowly rounded, marginal field exceedingly narrow, equal to less than one-fourth the greatest width of anal field, reaching distad nearly to line of apex of anal field, anal field with greatest width contained two and seven-tenth times in greatest length of same; costal veins twelve to thirteen in number, discoidal sectors of all origins six in number, several bifurcate to ramose, axillary veins four in number. Wings with apex rounded, costal veins of all origins eight in number, several distad bifurcate or ramose, ulnar vein with four[7] complete rami; medio-discoidal area mesad faintly broader than medio-ulnar area at same point, divided into subquadrate areolets by transverse nervures

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[5] Öfvers K Vetensk-Akad Forhandl, 1871, no 3, p 375, (1871)

[6] Ann Soc Ent France LXII, p 171, (1893)

Sixth abdominal tergite with distal margin broadly and shallowly obtuse-arcuate emarginate seventh abdominal tergite subexcavate meso-proximad, there with a median, transversely rounded but sublongitudinal raised area, proximad acuminate in shape, densely covered with adpressed, proximad directed hairs, whole median third of tergite slightly raised above level of lateral sections, this area with its boundaries converging in proximal two-thirds, subequal and with parallel margins in distal third, distal margin of tergite broadly arcuato-emarginate, that section involving the raised median portion somewhat differentiated and more strongly concavo-emarginate eighth tergite strongly transverse, distal margin weakly obtuse-angulate mesad, ultimate tergite (supra-anal plate) transverse, relatively brief, mesad obtusely subproduced, immediate apex narrowly truncate, meso-distal portion of tergite cut off from more proximal portion by a transverse arcuate surface impression a large pair of infra-cercal plates largely shut off much of anal orifice, the two meeting on median line Cerci elongate, relatively slender, composed of eleven articles, attenuate subfusiform, deplanate dorsad Ultimate sternite (subgenital plate) much resembling that of *Supella supellectilium*, trigonal in ventral aspect, faintly broader proximad than median length, stylar bases at distal third of the converging lateral margins, which at the inter-stylar apex are arcuately joined, but in addition with a small median concavity, styles simple, of equal length, briefly upcurved or hooked at apex, lying within anal orifice on dorsal surface of sternite

Cephalic femora with ventro-cephalic margin armed meso-proximad with five large spines, the two distal spines of unequal length, ventro-caudal margin with two spaced large spines distad, one of which is apical Median and caudal femora armed ventrad with spaced series of large spines

Allotype — ♀, Namutoni District, Damaraland, Southwest Africa July 9–11, 1930 (De Schauensee South African Expedition) [Academy of Natural Sciences of Philadelphia]

Head in dorsal view but narrowly visible cephalad of the pronotum; in cephalic aspect attenuate (ventrad) pyriform, greatest width across eyes equal to nine-elevenths of greatest depth (as 45 to 55); occipital interspace faintly broader than area between internal margins of antennal scrobes (as 19 to 18), palpi with relative proportions of three distal articles (reading proximad) as 13, 17 and 16

Pronotum with greatest caudal width equal to more than one and a quarter times its greatest median length (as 93 to 65); lateral margins regularly arcuate convergent cephalad, the narrow cephalic margin but weakly differentiated from the even arcuation of the lateral margins; caudo-lateral angles rounded subrectangulate, caudal margin arcuato-truncate surface contour of hyaline lateral areas as in male, disk low arcuate transversely, nearly straight longitudinally as seen in profile, no true sulci present

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[7] In other males these may be as few as two

Tegmina short, hardly extending caudad of the distal margin of the mesonotum, transverse subquadrate, greatest width (mesad) slightly greater than costal marginal length of tegmen, length of sutural margin equal to four-sevenths of median width costal margin very faintly arcuate, disto-costal angle very narrowly rounded rectangulate, sutural margin arcuate, distal margin moderately oblique, sinuato-truncate disto-costad, disto-sutural angle rounded, humeral trunk distinct, thick, arcuate, reaching distal margin mesad, marginal field broad, anal sulcus distinct, arcuately paralleling humeral trunk, reaching distal margin one-third of its length costad of disto-sutural angle, four axillary veins indicated, thread-like, regularly spaced; median interspace between tegmina broad, equal to three-fourths the width of a single tegmen (as 29 to 38) Distal margin of mesonotum sinuato-truncate, distal margin of metanotum very broadly and shallowly concavo-emarginate, caudo-lateral angles of metanotum rectangulate, lateral margins of same weakly arcuate

Abdomen relatively broad, semi-elliptical in outline, deplanate dorsad, penultimate tergite with distal margin broadly but shallowly convex, ultimate tergite (supra-anal plate) short, transverse, low trigonal, apex shallowly emarginate, there producing two low marginal rounded sublobations, from apical emargination there is continued proximad an evident linear sulcation Ultimate sternite (subgenital plate) broad, transverse, distal margin broadly arcuate between low obtuse lateral, infra-cercal shoulders of the margin, mesad with a very slight infolding or puckering of the margin cerci damaged

Cephalic femora with ventro-cephalic margin having but three large spines in the meso-proximal group in the only available female possessing cephalic limbs [8]

Coloration —General pale base color light ochraceous-buff, becoming ochraceous-buff distad on the tegmina in the male, dark pattern mummy brown Male with head bearing broad, subparallel bars of prout's brown on occiput and dorsal half of face, separated by a narrow, dorsad expanding pale area, buccal region and palpi washed with prout's brown, eyes mummy brown to bister, antennae pale, proximal article lined on internal face and annulate proximad with prout's brown, second article distad prout's brown passing to buckthorn brown pronotum with the marked, caudad expanding and moderately divergent bars of the general dark color, lateral areas hyaline. tegmina with a broad, distad narrowing dash of the general dark color reaching to slightly distad of middle to tegmen, proximad in position entirely suturad of humeral trunk, moving distad to the trunk abdomen pale with the area of the stigmata, base and apex of the cerci and glandular area on seventh tergite marked with mummy brown to prout's brown; coxae marked proximad, femora lined dorsad and ventrad to a greater or lesser degree, and tibiae varied with areas of mummy brown Female with head almost wholly prout's brown, palpi pale, lined or clouded with mummy brown, eyes russet (bister in some other females), antennae lacking· pronotum with disk solidly between proüt's brown and mummy brown in shade, lateral areas clear hyaline except that narrowly the dark disk extends to the caudo-lateral angles of the pronotum mesonotum and metanotum pale with caudal margins rather narrowly (mesonotum) or broadly (metanotum) bordered with the dark general color tegmina pale with a few discal and distal marginal points of dark color abdomen dorsad dark solidly except for proximo-lateral pale spots on tergites three and four, broader lateral pale pattern on six and seven, while the ultimate tergite is sharply pale mesad, venter of abdomen with two groups of two each of paired lateral pale spots, limbs as a whole more uniformly pale than in male

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[8] The allotype is in all other respects better preserved than the other females, but lacks all the legs. No one female seen has more than two limbs intact.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂ Gemsbok Pan	10 6	2.60	3.31	12.2	3.57
♀, Namutoni District *allotype*	9 1	2 60	3.86	1 47	1.59

The localities given above, plus the type locality furnish all the known information on the distribution of the species

The Species of the Genus Euandroblatta

In 1922[9] the genus *Euandroblatta* was erected for two austral African species of symplocoids showing marked affinity with the other genera of that stock, but possessing, along with a regular series of spines of uniform type on the ventro-cephalic margin of the cephalic femora, tarsal claws of unequal length and markedly asymmetrical development The species then known had, and all others now known have, distinctive and characteristic male genitalic features which show the basic affinity of the species, and cut them off from all other genera, when taken with the type of femoral spines and tarsal claws

In 1933[10] a study of Gerstaecker's types of West African blattids showed that one of his species, itself a synonym of one previously described by both Walker and Saussure, and a fourth species described as a *Liosilpha* by Shelford, were also members of the genus *Euandroblatta*

In the analysis of extensive African series now in my hands for study, I have recognized five other undescribed species of the genus, making a total of eight, and the present contribution brings together the at present available information on this striking and peculiarly African genus.

For the present study I have had before me a total of one hundred and four specimens of the genus, including the above mentioned type of Gerstaecker's *Phyllodromia amplicollis* and that of my *Euandroblatta propera*

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[9] Rehn, Ann. Transv Mus, IX, pp 19, 31, pls I, figs 21-23, II, figs 24 and 25

[10] Rehn Proc Acad Nat Sci Phila, LXXXIV, p 440

The greater portion of the material is from the series of the British Museum of Natural History, which includes representatives of six of the eight species here recognized The Academy collections will possess material of five of that total

EUANDROBLATTA Rehn

1869 *Blatta* Saussure, Mem Soc Phys Hist Nat Geneve, XX, p 250 [In part] (Not of Linnaeus, 1758)

1883 *Phyllodromia* Gerstaecker, Mitth Naturw Ver von Neu-Vorpomm und Rugen, Greifswald, XIV, p 66 [In part] (Not of Serville, 1839)

1907 *Ischnoptera* Giglio-Tos, Bollett Mus Zool Anat Comp Univ Torino, XXII, no 563, p 2 [In part] (Not of Burmeister, 1838)

1908 *Liosilpha* Shelford, Deutsch Entom Zeitschr, 1908, p 120 [In part] (Not of Stål, 1874)

1922 *Euandroblatta* Rehn Ann Transv Mus, IX pp 19, 31, pls I, figs 21-23 II, figs 24 and 25

Genotype (by original designation) —*Euandroblatta propera* Rehn

There is no occasion to repeat here the original description of the genus, or to discuss anew its general relationship In 1933[11] I pointed out, from the evidence of its genotype, that *Liosilpha* Stål is probably entirely Neotropical in distribution, and also is in no way closely related to *Euandroblatta* As our knowledge of the numerous symplocoid genera elaborates, it may be necessary to recast former opinions as to the nearest relatives of the present peculiarly African genus, but the time for that has not as yet arrived The purpose of this review is to describe certain new species, and to place together much unreported distributional and seasonal information on those species previously known

Distribution of genus—Reaching from north-central Tanganyika, southern and south-western Uganda, the northern Belgian Congo, central Cameroons and the Ivory Coast, south as far as Zululand and over much of the Transvaal We know nothing as to its occurrence in Angola or Southwest Africa, or in Nigeria and other portions of Upper Guinea That the genus will be found to be more widely distributed is virtually certain, and its occurrence in Angola at least can be expected

The maximum differentiation of the genus occurs in the territory embraced in Katanga, Northern and Southern Rhodesia and Nyasaland It is quite possible this is its center of distribution, yet the species occurring there have less extensive ranges than that form occurring across much of truly Equatorial Africa (*curta*)

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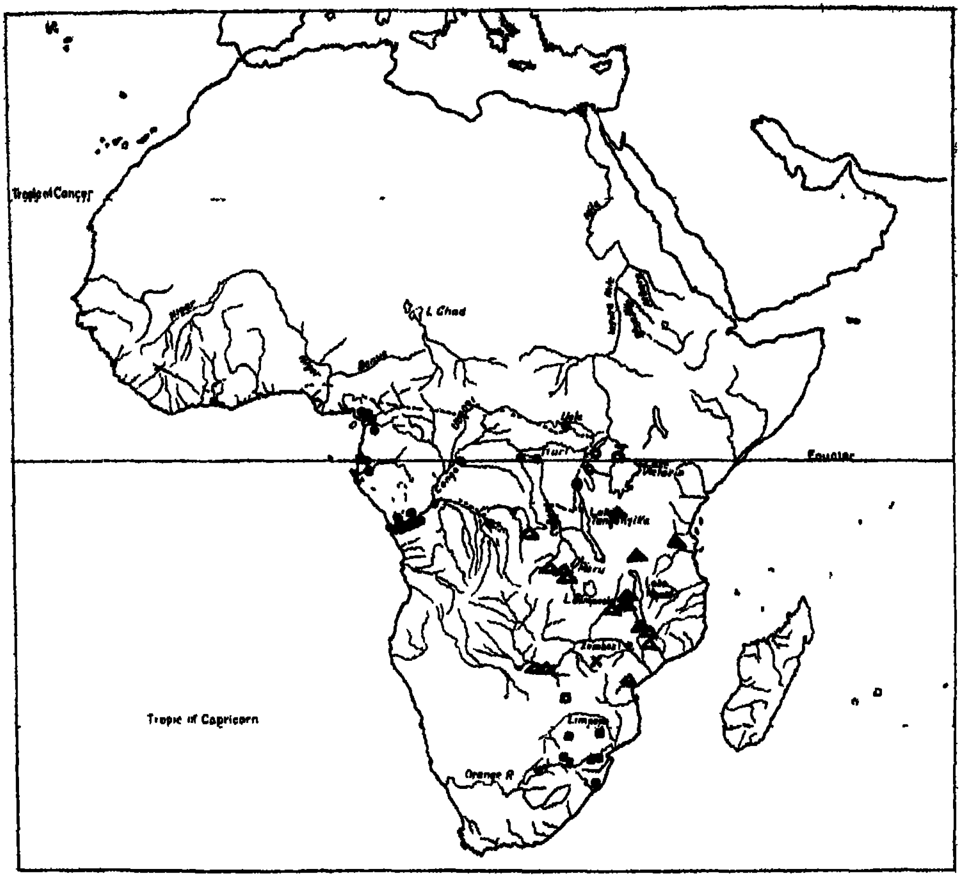
[11] Idem, pp 440-441



Map showing the distribution of the species of the genus *Euandroblatta*, using the exact localities from which the forms are now known. Dots indicate the localities for *E. curta*, circles of *E. kabaka*, solid squares for *E. propera*, hollow square for *E. matabele*, solid triangles for *E. selousi*, hollow triangles for *E. jallae*, vertical cross for *E. clavigera*, oblique cross for *E. marshalli*. (I have not been able to locate Kunungu, Belgian Congo, an additional locality for *E. curta*.)

Key to the Species

1 Size very small, body less than 11 millimeters in length (abdominal features of ♂ not known) . . . . *matabele*, new species

Size larger, body more than 12 millimeters, usually more than 15, in length 2

2 Ultimate sternite (subgenital plate) of ♂ with sinistral style far longer than distal one 3

Ultimate sternite (subgenital plate) of male with sinistral style shorter than dextral one, latter strongly falcate. (Size smaller, length of body of ♂, 13.6 mm.) . . . . . . *marshalli*, new species

3. Sinistral style of ultimate sternite (subgenital plate) of ♂ elongate clavate, thickened, blunted at apex. (Median section of distal margin of ultimate sternite broadly arcuate.) . *clavigera*, new species
Sinistral style of ultimate sternite (subgenital plate) of ♂ acute, bayonet-like, or slenderly subcultriform . 4
4. Median portion of distal margin of ultimate sternite (subgenital plate) of ♂ strongly produced 5
Median portion of distal margin of ultimate sternite (subgenital plate) of ♂ rounded, not strongly produced 6
5. Production of median portion of distal margin of ultimate sternite (subgenital plate) of ♂ rounded rectangulate. Ultimate sternite of ♂ dorsad of base of sinistral style not strongly quadrate lamellate, sinistral style slightly thickened in distad third, subclavate *jallae* (Giglio-Tos)
Production of median portion of distal margin of ultimate sternite (subgenital plate) of ♂ acute. Ultimate sternite of ♂ dorsad of base of sinistral style strongly quadrate lamellate, sinistral style tapering, attenuate *selousi*, new species
6. Median portion of distal margin of ultimate sternite (subgenital plate) of ♂ symmetrically arcuate, sinistral style of same substyliform, relatively thick, yet bluntly tapering, dextral style very short and simple, not depressed or denticulate *propera* Rehn
Median portion of distal margin of ultimate sternite (subgenital plate) of ♂ unsymmetrically arcuate, sinistral style of same tapering, acuminate, subflagellate, dextral style short, stout, subdepressed, denticulate . 7
7. Ultimate tergite (supra-anal plate) of ♂ triangular, converging sides nearly straight, apex narrowly rounded. Ultimate tergite (supra-anal plate) of ♀ more sharply trigonal, lateral margins nearly straight convergent to fissate apex. Tegmina with costal margin distad definitely rounding to the proportionately narrower apex *curta* (Walker)
Ultimate tergite (supra-anal plate) of ♂ linguiform, lateral margins markedly arcuate convergent distad, apex more broadly rounded. Ultimate tergite (supra-anal plate) of ♀ with lateral margins weakly sigmoid convergent to fissate apex. Tegmina with costal margin distad but little rounded to the proportionately broader apex *kabaka*, new species

Euandroblatta propera Rehn

1922. *Euandroblatta propera* Rehn, Annals Transv. Mus., IX, p. 32, pl. I, figs. 21, 22. [♂, ♀, Pretoria, Transvaal.]

TRANSVAAL: Moordrift, October, 1909, (C. J. Swierstra), one female; [Transv. Mus.]. Grootdraai, Olifants River, N. E. Transvaal, October, 1927, (H. Lang), one female, [Transv. Mus.]. Barberton, December, 1897–January, 1898, (J. P. Cregoe), one female, [So. Afr. Mus.]. Malelane, Barberton District, October, 1926, (H. Lang), one female, [Transv. Mus.]. Boksburg, east of Johannesburg, 1911, one female, [So. Afr. Mus.]

ZULULAND: Nagana Research Laboratory, 1922, (H. H. Curson), one male, [Brit. Mus. Nat. Hist.]

In addition to this material I have before me a paratypic female While most of the above-listed specimens are of the female sex, the identification of these has been made possible by careful comparison with that sex of all the other known species of the genus In addition the abdominal color pattern is a distinct aid in the recognition of the species

There is some variation in size, but not enough to cause difficulty in the association of the species

The distribution of *propera* is now known to reach from Zululand, and probably adjacent Portuguese East Africa, across the eastern and north-eastern Transvaal to the Pretoria and Johannesburg area, its range extending to at least as high as 5000 feet above sea-level

Euandroblatta matabele, new species Plate 8, fig 6

A diminutive species probably more nearly related to *E propera* than any other But a single female is known, and I would not describe it without knowledge of the male features, if the species was not so sharply and readily separable When the male is known it will probably show very distinctive genitalic characters When compared with the female sex of *propera* the present species is seen to have but a fraction of the bulk, the pronotum to be less strongly transverse, the marginal field and the scapular field of the tegmina distinctly narrower, the tegminal axillary and costal veins fewer, the caudo-lateral angles of the abdominal tergites more rectangulate and less produced, the ultimate tergite (supra-anal plate) more distinctly transverse trigonal and more feebly notched at apex, while the species also possesses a more transverse head, stockier palpi and lighter and more elongate limbs

Type — ♀, Bulawayo, Southern Rhodesia [South African Museum]

Size very small, the smallest member of the genus (body length, 10 7 mm) form more slender than in the related species

Head hardly at all visible cephalad of pronotum when viewed from dorsum, in cephalic aspect the head is seen to be very broad cordiform, strongly narrowing ventrad of eyes to buccal region, greatest width across eyes subequal to depth of head occipital outline, as seen in cephalic aspect, moderately arcuate, very faintly more so than the adjacent eye arcuation, least interspace between eyes broad, equal to two-thirds that between internal margins of antennal scrobes palpi very robust and short, the ultimate article exceptionally stout and large proportionately, its length equal to one and two-third times the greatest (extensor) length of the penultimate article and over two and one-half times its flexor length, depth of ultimate article as seen in lateral aspect almost as great as half its length, extensor outline in same aspect nearly straight, flexor outline distinctly arcuate, apex blunt acute, penultimate article almost trigonally infundibuliform, its depth distad subequal to its axial length and equal to two-thirds its greatest (extensor) length, antepenultimate article of the form usual in the genus but very stout, equal to seven-tenths the length of the ultimate article Antennae incomplete but the remaining portions stouter than in the related species

Pronotum trapezoidally ovate, median length contained about one and three-tenth times in greatest width, which is at caudal third. cephalic margin distinctly arcuate, its curvature essentially that of the head, laterad passing, without definite angles, into the gently arcuate, oblique, caudad diverging lateral margins, which broadly rounding over the lateral angles, pass into the quite short but definite caudo-lateral margins, which in turn are nearly straight convergent, continuing over the rounded but definite lateral angles of the caudal margin into the latter, which is transverse and but weakly arcuate, almost without trace of a median angulation surface of pronotal disk appreciably deplanate, lateral areas moderately declivent

Tegmina failing to reach apex of abdomen by a distance equal to half the pronotal length, in shape elongate lanceolate, as a whole of subequal width, apex broadly rounded, greatest (median) width equal to two-fifths of tegminal length costal margin moderately arcuate, less distinctly so in median half, sutural margin nearly straight for most of its length, distinctly arcuate briefly proximad, and in distal fourth rather abruptly so to the broadly rounded and not at all acuminate apex marginal field rather narrow for the genus, its greatest width subequal to a third the same dimension of the anal field, acuminate distad but its apex falling distinctly short of that of the anal field, scapular field of moderate width, almost twice as broad as the marginal field, anal field rather elongate pyriform mediastine vein faintly sigmoid, costal veins seventeen in number (counting all bifurcations as units), all to a degree arcuate oblique, instead of straight oblique, humeral trunk faintly sigmoid, moderately arcuate proximad, discoidal sectors sublongitudinal,[12] eight in number (counting all bifurcations), anal vein moderately arcuate in proximal half, thence oblique and nearly straight to the distal sixth, where it is quite sharply arcuate, joining the sutural margin in a right angle at a point briefly proximad of the middle of the margin, but six axillary veins clearly defined, those toward anal vein quite widely spaced, while those toward the sutural margin are closely placed Wings reaching to tegminal apices[13]

Caudo-lateral angles of abdominal tergites not at all produced, narrowly rounded rectangulate to (distad) obtuse-angulate, penultimate tergite with its margin weakly arcuate ultimate tergite (supra-anal plate) very broad and low trigonal, its greatest median length contained almost three times in the greatest proximal width of the tergite (as 2 2 to 6 5), lateral margins straight convergent to the blunt and very shallowly emarginate apex ultimate sternite (subgenital plate) with its margin broadly arcuate with only the faintest intimation of a separation of the lateral and median portions of the same cerci incomplete

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[12] As will be noted in many other species of blattids with moderate tegminal reduction in genera with tegmina averaging somewhat longer, the abbreviation of the tegmina has thrown the sectors into a slightly oblique trend instead of their being entirely longitudinal as in the related species This is due, apparently, to a resultant crowding between the humeral trunk and the anal vein, which are the fundamental venational boundaries, and the lack of space preventing the usual proximal arcuation of the rami which thus bend normally into the longitudinal trend This condition should not be confused with the true oblique trend of the discoidal sectors which we now know is one of the features of a number of genera

[13] The type is unique and in a damaged condition which will not permit spreading without assuming unwarranted risk

Limbs lighter and more elongate than in *E propera;* cephalic femora having spines of ventro-cephalic margin relatively short, but disposition and general character as usual in genus, distal group three, large proximal group two to three, ventro-caudal margin with four spaced spines, the distal the longest, caudal tibiae relatively slender· caudal tarsi with proximal article slightly longer than remaining articles, its pulvillus apical, arolia large, tarsal claws strongly asymmetrical

Color of disk of pronotum and tegmina ochraceous-buff with a definite tinge of ochraceous-orange, the pronotal disk unmarked except for weak indications of the paired comma-like darker lines placed latero-cephalad, as in the other species of the genus, lateral areas of pronotum subhyaline, marginal field of tegmina relatively opaque Head and limbs of the general dorsal color, the head with a relatively deep inter-ocular bar of mars brown; antennae pale buckthorn brown Dorsal surface of abdomen almost solidly mummy brown, the tergites rather broadly margined laterad with ochraceous-buff proximad, evenly darkening distad to ochraceous-orange, the latter involving the entire distal two-thirds of the ultimate tergite (supra-anal plate), ventral surface of abdomen with its disk paler mummy brown, approaching hay's russet mesad on the ultimate sternite (subgenital plate), the sternites laterad bordered with ochraceous-buff, slightly tinted with ochraceous-orange on the more distal ones, the pale margin not extending distad on the ultimate sternite caudad of the cerci, latter prout's brown

Length of body, 10 7 mm , length of pronotum, 2 68, greatest width of pronotum, 3 44, length of tegmen, 7, greatest width of tegmen, 2 6

The type of this most interesting species is unique The discovery of the male sex is awaited with interest

Euandroblatta curta (Walker) Plate 8, figs 7-10

1868 *Blatta curta* Walker, Cat Spec Blatt Brit Mus, p 220 [♀, "Congo"]

1869 *Bl[atta] anomala* Saussure, Mém. Soc Phys Hist Nat Genève, XX, p 250 [♀, Gaboon]

1883 *P[h]yll[odromia] amplicollis* Gerstaecker, Mitth Naturw Ver von Neu-Vorpomm und Rugen, Greifswald, XIV, p 66 [♂, Dangila, Gaboon]

1893 *Blatta amplicollis* Bolivar, Ann Soc Entom France, 1893, p. 171 [♀, Assinie, Ivory Coast]

1908 *Liosilpha bicolor* Shelford, Deutsch Entom Zeitschr, 1908, p 120, pl II, fig 5 [♂, ♀ (type), Cameroons]

1933 *Euandroblatta anomala* Rehn, Proc Acad Nat Sci. Phila, LXXXIV, p 440, pl 31, figs 15-20 [Gerstaecker's type re-examined, generic position and synonymy of *amplicollis* established and material recorded from Lambarene, Ogowe River and Libreville, Gaboon River, Gaboon]

1933. *Euandroblatta bicolor* Rehn, Proc Acad Nat Sci Phila, LXXXIV, p 441 [Generic position]

CAMEROONS Lolodorf, April, 1914, (A I Good); one male, [Carnegie Museum] Edea, one male, [Hebard Cln]. Johann-Albrechtshohe, (Rhode), one male, one female, [Vienna Mus] Mundame, (Rhode), two females, [Vienna Mus.]

French Equatorial Africa; Gaboon Libreville, December, 1913, (G. Babault), one male:[14] January 1–2, 1931; (A Tinant); one male;[15] [Mus. Belg. Congo] Lambarene, Ogowe River, 1911 and 1912, (R. Ellenberger); two females (one minus abdomen), [Paris Museum]

French Equatorial Africa, Middle Congo M'Bamoa, twenty-five miles west of Brazzaville, 1903, (Montezer), two females, [Paris Museum].

Belgian Congo. Vista, Lower Congo District, August 12, 1920; (H Schouteden), one female, [Mus Belg Congo] Moanda, Lower Congo District, August 21, 1920, (H Schouteden), one male; [Mus Belg Congo] Banana, Lower Congo District, June 20 and August, 1910, (Dr Etienne), one male, one female, [Mus Belg Congo] Boma, Lower Congo District, (R F Achille), one female July 30, 1928, (Lt M Van Delft), one female, [Mus Belg Congo] Tshela, Mayumbe, Lower Congo District, February 13–24, 1916, (R Mayne), one male, [Mus Belg Congo] Temvo, Mayumbe, Lower Congo District, (Lance), one female, [Mus Belg Congo] Congo da Lemba, Lower Congo District, April and May, 1911; (R Mayne), one female, one immature, [Mus Belg Congo] Tumba region, Lower Congo District, August–November, 1915, (P Vanderijst), one immature, [Mus Belg Congo] Kisantu, Lower Congo District; May, 1919 and December, 1920 and 1927, 1932, (P Vanderijst), one male, three females, three immatures, [Mus Belg Congo] Lemfu to Ngidinga, Lower Congo District, (P Vanderijst), one immature, [Mus Belg Congo] Kwamouth, Lower Congo District, June, 1921, (H Schouteden), one female, [Mus Belg Congo] Lower Kasai, July, 1913 and September, 1920, (P Vanderijst), two males, one immature, [Mus Belg Congo] Kolo-Kwilu-Madiata, September, 1913, (R Verschueren), one male, [Mus Belg Congo] Eala, Equator District, 1917 (females only), (R Mayne), one male, two females, [Mus Belg Congo] Luebo, Kasai District, (D W Snyder), one male, [U S N M] Ubangi District, July 12, 1921, (H. Schouteden), one female, [Mus Belg Congo] Isangi, Aruwimi District; August 1, 1909, (Lang and Chapin), one female, [A M N H] Stanleyville, Stanleyville District, February, 1915, (Lang and Chapin), one male, [A M N M] Niangara, Uele District, November 17–19, 1910, (Lang and Chapin), one female; [A M N H] Kunungu, 1932, (Schouteden), one male, [Mus Belg Congo]

The synonymy of *amplicollis* under Saussure's *anomala* was established by me in 1933 after examining Gerstaecker's type.[16] At that time I considered Shelford's *bicolor* to be distinct An increasingly critical study of other names proposed for West African blattids pointed toward Walker's

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[14] This specimen was compared by me in 1933 with the type of *amplicollis*

[15] Already recorded by me (Proc Acad Nat Sci. Phila, LXXXIV, p 441, (1933))

[16] Vide supra

curta being based on the same species as those of Saussure and Gerstaecker. The description, however, was by no means conclusive, and at my request Dr. Uvarov kindly compared the female individual from Congo da Lemba, here recorded, with the types of Walker's *Blatta curta* now in the British Museum of Natural History. His comments leave no question in my mind as to the identity of Saussure's *anomala* and Gerstaecker's *amplicollis* with Walker's insect.

Dr. Uvarov's notes are as follows: "Two specimens with the same data as above" [This refers to the types of *Periplaneta flexivitta* Walker, regarding which his notes are, "collected by Andrew Curror, R. N. Surgeon and presented to B[ritish] M[useum] by Dr. Richardson in 1843. They are labelled simply 'Congo' and no further details are obtainable as to locality, but it appears probable from the collector's profession that they were taken on the coast of West Africa."] "Sex unknown [Walker gives them as females], as the abdomens are missing in both. Tarsal claws strongly unequal, both falciform in shape. Venation of elytra and wings as in your species. Proportions of posterior tarsal joints 30 11 7 2.5 14. Spines on the ventro-cephalic margin of anterior femora of uniform type, slightly decreasing in size distally. Palpi appear different from your example, as will be seen in the enclosed camera-lucida sketch. The shape of the distal article is identical in both type specimens, though they differ in the length of elytra (11 and 12.5 mm. respectively) and may represent two sexes."

The palpi difference referred to above by Dr. Uvarov is almost entirely in the more slender antepenultimate article of the types, as compared with the specimen sent. This is doubtless due to a difference in the method of preservation, as I find that in material dried after immersion in a liquid preservative this article is more slender, apparently much more contracted in diameter than in individuals preserved without immersion. The ultimate palpal article also is liable to show a difference in the lateral outline if it is more depressed or compressed than what may be called its normal condition.

From Dr. Uvarov's comments, and my knowledge of the matter discussed in the preceding paragraph, I feel there is no question but that Walker's *Blatta curta* was based on the present species.

The locality "Congo" placed on the types refers either to the Congo estuary district, from which I am here recording numerous specimens, or the old kingdom of Congo in nearby northern Angola.

With the rather extensive series above listed now available for examination, it is clearly evident that Shelford's *bicolor* was based on the intensively and contrastingly colored phase of the species, known to him only for the Cameroons, and which is well represented by the Lolodorf and

Johann-Albrechtshohe individuals recorded above, all of which fully agree with Shelford's description.[17] The Edea male and the two females from Mundame have the fuscous element in the transverse barring of the venter of the abdomen less marked or extensive, while in that from Edea and one of those from Mundame the tibiae and tarsi are nearer cinnamon-brown that blackish fuscous.

There is also some approach to the *bicolor* extreme in color features in other material in the Gaboon and Belgian Congo series recorded above, and there is no feature of structural difference or proportions to distinguish the Cameroons and Gaboon individuals. The disk of the dorsal surface of the abdomen is frequently almost solidly pitch brown, as in certain individuals of both sexes from Johann-Albrechtshohe, Mundame, Lolodorf, Lambarene, M'Bamou, Boma, Stanleyville and Niangara, but this discal infuscation is not linked with the infuscation of the tibiae. A Tshela, Mayumbe male with the tibiae distinctly infuscate has the disk of the abdominal dorsum almost without infuscation, and is in this respect in full agreement with the Edea, Cameroons male. It is clearly evident the species has intensive and recessive color phases, but not all elements of the color pattern are equally responsive.

A detailed description of the male sex of the species, drawn from Gerstaecker's type, has been given by me in the paper to which reference has already been made. Due to shrivelling and distortion in this type the structure of the distal abdominal tergites described does not represent the normal condition, and on account of the telescoping of the eighth tergite under the seventh, the ninth was erroneously called the eighth. The figure of the dorsum of the abdominal apex in the present study should be used instead of the 1933 description for an understanding of the contour of the sixth to ninth abdominal tergites of the male.

The present series shows that, as in numerous members of related general, the tegmina and wings of the males are always longer and more ample than in the female sex. There is a marked amount of variation in general size in both sexes, but no single series is sufficiently large to show whether this is individual or geographic, the indications, however, pointing toward geographic correlation of this feature.

The extremes in size in the above listed material measure (in millimeters) as follows:

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, Lower Kasai	13.5	3.8	5.2	12.2	4.1
♂, Luebo	16.5	4.9	7.4	16.3	6.4
♀, Kwamouth	11.2	4	5.8	10.2	4.5
♀, M'Bamou	14.3	5.1	7.5	11.8	6

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[17] Shelford erroneously associated *bicolor* with the peculiarly American genus *Liosilpha*.

The distribution of *curta* covers a greater area than any other member of the genus, reaching from the Ivory Coast (Assinie, as reported by Bolivar) to Niangara, Uele District, Belgian Congo, and from as far north as Johann-Albrechtshohe, Cameroons and Niangara, south to the region of the lower Congo and most of the main Kasai. It is essentially a species of the forest region, but enters the transitional (gallery) forest belts to the north and south of the solidly forested area.

Euandroblatta kabaka,[18] new species Plate 8, figs 11-13

Very closely related to *E. curta*, which it apparently replaces in Uganda and other areas along the eastern edge of the Lower Guinea Forest District.[19] The chief features of difference are the broader, linguiform production of the ultimate tergite (supra-anal plate) of the male, as opposed to the definitely triangular shape of the same area in *curta*, the less trigonal outline of the same tergite in the female, the converging lateral margins in *kabaka* being appreciably sigmoid and distinctly less straight oblique than in *curta*, the apex, of course, briefly fissate in both species, and the tegmina in their entirety more uniformly subequal in width than in *curta*, the costal margin distad less definitely arcuate and the tegminal apices broader and more subtruncate.

Type.—♂, Between Entebbe and Mityana,[20] Uganda Protectorate July 31, 1912. (C. C. Gowdey.) [British Museum of Natural History.]

Size medium, form and surface as a whole much as in *E. curta*.

Head as seen from dorsum but narrowly visible cephalad of pronotum, in cephalic aspect broad cordiform, very slightly broader across eyes than deep (as 10 to 9.5), markedly narrowing ventrad from eyes to buccal region, occipital line, as seen in cephalic aspect, moderately arcuate, slightly more so than the adjacent eye outline as seen in the same view, least interocular space equal to one-half that between internal margins of antennal scrobes (as 1.9 to 3.8). palpi of the type characteristic of the genus, distal article one and three-fourth times as long as the penultimate (as 3.5 to 2), penultimate very short and broadly infundibuliform, antepenultimate four-fifths as long as ultimate (as 2.8 to 3.5). antennae longer than the body.

Pronotum in outline ovate sub-trapezoidal, greatest median length contained one and nine-twentieth times in greatest width of same, which is placed slightly cephalad of the caudal third. cephalic margin moderately arcuate, laterad broadly rounding into the slightly arcuate, caudad diverging lateral margins, which pass by the distinct and very narrowly rounded lateral angles into the brief but definitely marked caudo-lateral sections of the margin, these very weakly arcuate, strongly convergent and continuing by a well rounded, but still evident angulation into the sub-obtuse angulate caudal margin, the median very low production of which is very broadly rounded, all margins very narrowly cingulate, slightly broader laterad surface of pronotum as a whole transversely low arcuate, faintly more deplanate on the disk, longitudinally very weak arcuate

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[18] *Kabaka*, the title of the native ruler of the Baganda people.

[19] As used by Chapin in his "Birds of the Belgian Congo" (Bull. Amer. Mus. Nat. Hist., LXV, p. 90, (1932).)

[20] This is also spelled Mitiana and Mityana.

Tegmina with greatest median width contained two and three-fifth times in the tegminal length, in general shape subrectangulate-lanceolate with apex not at all produced costal margin as a whole low arcuate, slightly less so mesad than proximad and distad, sutural margin in large part nearly straight, distal fourth broadly arcuate to the well rounded and not at all acuminate apex, which is nearer the costal axis than that of the main portion of the sutural margin marginal field broad, at widest point (proximad) equal to seven-twentieths the width of anal field, its greatest width contained four and one-half times in greatest evident length of field, its apex distinctly failing to reach distad as far as that of the anal field, scapular field moderately wide, at broadest point equal to twice that of marginal field, anal field pyriform, greatest width contained two and three-tenth times in length of same mediastine vein very faintly arcuate distad, costal veins of scapular field fifteen in number, including each bifurcation in this count, straight, oblique, humeral trunk moderately arcuate, discoidal sectors longitudinal, ten in number, anal vein well arcuate in proximal half, then straight oblique for approximately two-fifths of its length and finally passing by an obtuse-angulation into a brief, straight, more oblique and less longitudinal section, which joins the sutural margin but faintly proximad of the middle, axillary veins seven to eight in number Wings with apex having the same curvature as apex of tegmen costal veins of all origins fifteen in number, non-clavate, discoidal vein straight, median simple, medio-discoidal area in greater part subequal in width to medio-ulnar, never wider, cross-veins in former relatively regular, making areolets rectangular, ulnar vein in type with but three rami, of which median one is triramose[21]

Seventh abdominal tergite with its distal margin very shallowly concave, lateral margins oblique convergent, caudo-lateral angles distinct but obtuse, glandular depression occupying in length the proximal third of the median half (transversely) of the surface of the tergite, the depression deeply concave and in general form transversely bilobate, the lateral sections longer (longitudinally) than the same median dimension of the gland area, seen from dorsum the lateral borders of the area are arcuate convergent, its distal border concave ninth tergite[22] as in *E curta* ultimate tergite (supra-anal plate) with its median produced area distinctly linguiform, the median length of the same production equal to the proximal width of that area, lateral margins definitely arcuate, little converging in proximal half, very definitely so in distal half, apex rather broadly rounded with a shallow median emargination ultimate sternite (subgenital plate) unsymmetrical, its greatest length appreciably dextrad of middle and margining of the Forest Province, reaching from at least as far north as the lower Semliki River to Toro and probably Lake Kivu We have no evidence of its occurrence east of Lake Victoria and very likely its presence requires a definite forest influence While in much of Uganda the forest areas are localized and not as general as in all of the Lower Guinea Forest Subprovince, the areas of true forest are comparable in extent to those of the "gallery forest" belt present to the north of that Subprovince, and in which *curta* occurs

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[21] The three females examined show a range in these rami from the condition found in the type to an opposite extreme having five regular spaced and undivided rami (allotype)

[22] Due to the eighth tergite being retracted and hidden in the type of Gerstaecker's *amphicollis* (=*curta* Walker), the ninth tergite was erroneously called the eighth by me when redescribing Gerstaecker's type (see Proc Acad Nat Sci Phila, LXXXIV, pp 440-443, (1932))

Euandroblatta jallae (Giglio-Tos)

1907 *I[schnoptera] jallae* Giglio-Tos Bollett Mus Zool Anat Comp Torino, XXII, no 563, p 2 [♀, Kazungula, Zambesi River, Rhodesia]

1908 *Periplaneta adelungi* Karny, Denkschr Med-Naturwiss Gesell Jena, XIII, p 380, pl XXI fig 27 [♂, Levingstaue (error for Livingstone), Zambesi River]

1922 *Euandroblatta jallae* Rehn, Ann Transvaal Mus, IX, p 34, pl 1 fig 23 pl II, figs 24 and 25 [Generic position]

BELGIAN CONGO LOMAMI Kabinda, (Dr Schwetz), one female, [Mus Belg Congo]

BELGIAN CONGO KATANGA between Luapala River and Tumbwe, November 24, 1930, (G F de Witte), one female, [Mus Belg Congo] Lukafu, December 6-22, 1930, (G F de Witte), one female, [Mus Belg Congo] Busanga, October, 1922, one presumably female (abdomen lacking), [Mus Belg Congo]

NORTHERN RHODESIA Mid-Luangwa Valley, elevation 3000–3180 feet, August 23–31, 1910, (S A Neave), one male, [Br. Mus Nat Hist]

SOUTHERN RHODESIA Mt Chirinda, October–November, 1911, (C F M Swynnerton), one male, [Br. Mus Nat Hist]

NYASALAND Mlanje, elevation 2300 feet, October 4, 1913, November 8–11, 1912, December 21, 1913, (S A Neave), two males, eight females, [Br Mus Nat Hist]

PORTUGUESE EAST AFRICA no exact locality, 1907, (G A K Marshall), one male, one female, [Br Mus Nat Hist] Foothills north of Mt Chaperone, elevation 2500 feet, November 19, 1913, (S A Neave), one female, [Br Mus Nat Hist].

In addition to these specimens I have before me the male labelled "Zambesia" which I figured in 1922, as noted above

In 1922 I suggested the probability[24] that Karny's *Periplaneta adelungi* would prove to be the same species as Giglio-Tos' *Ischnoptera jallae*, these described from localities hardly fifty miles apart In the light of present knowledge I have gone over the situation anew and now feel there can be no question of the correctness of the then suggested synonymy. Karny's description of the ultimate tergite (supra-anal plate) as "trigona, apice obtusata", taken with features of the coloration of the abdominal dorsum, is sufficient to establish the specific identity of *adelungi*

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[24] Ann Transv Mus., IX, p 34

The detailed description of the male genitalia and the figures of the same already given by me should assist in the recognition of this well-marked species

There is an appreciable amount of size variation in the Mlange series of females, as the measurements (in millimeters) of the extremes shown below testify With these are the measurements of the two Rhodesian males, which furnish the extremes of the series for that sex

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♀, Mlanje	15.8	5	6.5	13.5	5.8
♀, Mlanje	17 6	5 2	7 1	16.3	6
♂, Mt Chirinda	15	4 6	6	14	5.5
♂, Mid-Luangwa Valley	18	4 4	6.5	15.8	6

Taken with previously published measurements these show there is quite noticeable individual, and possibly also geographic, size variation, but the representation of males is too limited to be convincing on the latter point

The body coloration in *jallae* shows a range from a recessive extreme, which was described by me in 1922, with the fuscous areas greatly limited on both the dorsal and ventral surfaces of the abdomen, to an opposite intensive condition in which the incomplete and broken intermarginal fuscous markings of both surfaces coalesce on the venter into broad, nearly continuous bars, sharply contrasting the ochraceous borders and the buckthorn brown to rufescent disk, and on the dorsum suffuse almost the entire surface except for the rather narrow ochraceous lateral borders, and that of the distal portion of the ultimate tergite (supra-anal plate), as well as a proximo-mesal rufescent area

The Busanga, Katanga individual here reported lacks its abdomen, but it has an exceptionally intensive coloration, with all the dorsal surface except the pale ochraceous lateral borders to the pronotum and similar colored marginal fields of the tegmina solidly fuscous, virtually mummy brown, while the palpi and limbs are heavily washed with the same It distinctly suggests the coloration of the Nearctic *Parcoblatta pensylvanica*

The distribution of *jallae* is now known to extend from Southern Rhodesia (Mt Chirinda) northward across the Zambesi into southern Nyasaland (Mlanje), northeastern Rhodesia (Mid-Luangwa Valley) and southeastern Katanga (Lukafu and between Luapula and Tumbwe), westward as far as the Zambesi above Victoria Falls (Kazungula) and eastward into Portuguese East Africa

Euandroblatta selousi,[23] new species Plate 8, figs 14 and 15

This species is more nearly related to *E. jallae* than any other, but from this it is readily separable in the male sex by the genitalia, while in the female the two can be distinguished only by rather subtle relative features In the male the ultimate sternite (subgenital plate) has the production of its interstylar section distinctly and rather sharply acute-angulate, instead of roundly rectangulate as in *jallae*, the sinistral style is more regular arcuate tapering and less subclavate, the distal margin of the same sternite sinistrad of the insertion of the sinistral style is sharply rectangulate emarginate instead of obliquely sinuate, while dorsad of the base of the style it is developed into a subquadrate chitinous plate, which has its distal margin closely serrulato-denticulate. In *jallae* the analogous structure to this last-mentioned plate is less than a fourth the size found in *selousi*, and has its free margin rounded, with fewer, less numerous teeth

In the female of *selousi*, when compared with that of *jallae*, the sole features which seem to be of diagnostic value are the relatively narrower marginal field of the tegmina in *selousi*, and the more delicately notched apex of the ultimate tergite (supra-anal plate) in the same insect

Type — ♂, Lulanguru, seventeen miles west of Tabora, Unyanyembe, Tanganyika Territory Elevation, 1148 meters November, 1917 (G D H Carpenter) [British Museum of Natural History.]

Size relatively large (for the genus), form very similar to that of *E jallae*

Head for most of its width narrowly evident cephalad of pronotum as seen from dorsum, outline of head, as seen in cephalic aspect, cordiform, the greatest width across eyes subequal to depth of head, occipital line weakly arcuate, continuous with the curvature of the eyes, interspace between the eyes relatively narrow, not greater than half that between the internal margins of the antennal scrobes, infra-ocular borders of head regularly straight oblique convergent ventrad to the narrow buccal region· ultimate palpal article with its extensor length equal to one and nine-twentieth times the same length of the penultimate article, of the moderately inflated elongate securiform type found in all the forms of the genus, form of the penultimate article rather elongate, infundibuliform, more attenuate than in *E jallae*, its distal width equal to but faintly more than two-fifths of the extensor length of article, antepenultimate article but slightly shorter than extensor length of ultimate article (as 3 2 to 3.8) Antennae surpassing length of body by at least the pronotal length

Pronotum in general semi-ovate subtrapezoidal, its greatest median length contained one and nine-twentieth times in greatest width of same cephalic margin broadly and evenly arcuate, passing laterad without definite angles into the caudad diverging but faintly arcuate lateral margins; point of greatest width faintly cephalad of caudal third, the angle narrowly rounded but well marked, caudo-lateral margins short, nearly straight, caudad convergent, caudal margin very weakly obtuse-angulate mesad; surface of disk subdeplanate, lateral areas of pronotum moderately declivent, evenly rounding into disk.

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[23] In memory of Frederic Courtney Selous, an ever-memorable figure in the natural history of South and East Africa

Tegmina elongate lanceolate, greatest median width but faintly more than one-third the length of same; costal margin but moderately arcuate except in distal fifth where it bends quite sharply to the blunt, rounded apex, sutural margin nearly straight except in the distal fourth which is obliquely arcuate to the apex, the position of which is slightly suturad of the median axis of the tegmen; marginal field with its greatest width contained five and one-third times in the length of the field, equal to one-third the width of the anal field, scapular field equal to two-fifths the tegminal width, anal field elongate, very blunt pyriform, its greatest width equal to virtually two-fifths the length of the field (as 4.5 to 11.5), apex broad and blunt; mediastine vein straight oblique, costal veins twenty-one to twenty-three in number counting all rami of all origins in the scapular field, discoidal sectors twelve in number, completely longitudinal except for the proximal arcuation of a number of the group, anal vein not at all sigmoid, moderately and broadly arcuate at proximal two-fifths, proximad of same virtually straight and almost longitudinal, distad of same straight oblique, at distal sixth vein is arcuate rather abruptly and thence nearly straight transverse, joining the sutural margin at a right angle at two-fifths of the length from its base, axillary veins eight in number, rather closely placed. Wings with apex as that of tegmina, costal veins of all origins (including rami) fifteen in number,[26] non-clavate, six or so mesad faintly heavier than the others, medio-discoidal and medio-ulnar areas subequal in width, both relatively narrow, the cross-veins forming numerous rectangulate areolets, ulnar vein with six complete and two incomplete rami.

Abdominal tergites two to six with caudo-lateral angles moderately produced, the immediate apices narrowly rounded, distal margin of sixth tergite in general transversely concave, this shallowly but appreciably bisinuate on each lateral half; seventh tergite somewhat longer than the sixth, caudo-lateral angles obtuse, not at all produced, distal margin transversely truncate with median half low arcuate expanded, surface of seventh tergite with proximal half of median area occupied by a markedly excavate glandular impression in which rises a central elevated tectate structure, that in turn has its ventro-distal face very distinctly and concavely excavate, seen from dorsum this structure is low carinate medio-longitudinally, its apex acute and its distal outline biconcave in same view, surface of median section of tergite distad of this structure subdeplanate with numerous spaced briefly chaetigerous shagreenous points, which are directed proximad; surface of tergite laterad of central surface ascending in that direction from the depression to slightly converging, low, non-carinate swellings which reach nearly to the distal margin and each of which bears on their internal slope mesad an off-set shoulder bounding distad a circular lateral section of the glandular depression and bearing on its dorsal surface a group of elongate chaetae, while laterad of these elevations the surface of the tergites is subdeplanate toward the lateral margins; eighth tergite relatively short, distal margin low arcuate, caudo-lateral angles not at all produced and obliquely subtruncate; ninth tergite quite short, less exposed than eighth, distal margin arcuate to same degree as that of eighth, caudo-lateral angles briefly produced, moderately acute ultimate tergite (supra-anal plate) produced trigonal, its greatest median length equal to five-sevenths of the proximal width between points dorsad of the cercal axes, lateral margins straight, regularly oblique convergent to the bluntly rounded apex, surface of tergite with a narrow and shallow but definite medio-longitudinal sulcation, distal portion of plate weakly deflexed ultimate sternite (subgenital plate) decidedly asymmetrical, slightly acute trigonally produced, the point of greatest length appreciably dextrad of median line, general shape of margin of tergite, reading from dextral base, to dextral stylar section slightly inclined mesad, virtually straight, angle dextrad of stylar socket sharp, subrectangulate, socket rather deeply concave, thence to most distal point the margin is straight oblique, the angle of that point rectangulate, from which sinistrad the sternite is bimarginate, the stylar socket between the two, of the margins the ventral sinistrad of the angle is almost straight oblique to the much more proximal, broader but much more shallow sinistral stylar socket, this situated virtually at the normally evident sinistral base, the more dorsal margin borders a supra-stylar lamellate expansion of unusual character, developed as a broad rectangulate flange-like plate, in area little less than all the remainder of the sternite, its rectangulate apex extending distad almost as far as the true apex of the sternite, both the distal and sinistral borders of this expansion concave, the former with a regular and pronounced series of mesad recurved teeth of uniform length, ventral surface of ultimate sternite subdeplanate as a whole except for a dorsal upcurving on the dextral side, dextral style short, simple, slightly tapering, blunt, distinctly failing to reach apex of sternite, with a few short radiating chaetae, sinistral style heavy, moderately tapering, falciform, subcompressed, reaching nearly to apex of sternite, its apex blunt and on convex side with a few closely placed teeth, the same side with a number of erect, spaced chaetae cerci of the usual type, tapering, little expanded, distinctly surpassing apex of ultimate tergite

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[26] The series of the species shows as many as eighteen clearly indicated.

Cephalic femora with ventro-cephalic margin bearing thirteen stout and spaced spines, increasing in length proximad and distad, the longer proximal ones three in number and approximately equal in length to half that of the most distal spine, ventro-caudal margin with five spaced spines (including longer distal ones), caudal tarsi with proximal article slightly longer than remaining articles combined (as 8 to 7), pulvillus distal; arolia large, tarsal claws markedly unequal

Allotype —♀, same data as type [British Museum of Natural History]

Differing from the above description of the male (type) in the following noteworthy features

Head with occipital interspace between eyes somewhat broader, slightly greater than half that between internal margins of antennal scrobes (as 2.3 to 4 3)

Pronotum essentially as in male but slightly less strongly transverse and cephalic and caudal margins slightly less produced, the former not as distinctly arcuate, the latter less appreciably obtuse-angulate mesad.

Tegmina distinctly broader and less elongate, not surpassing apex of abdomen, in general outline rectangularly lanceolate, the greatest median width contained approximately two and six-tenth times in the tegminal length; apex broadly and transversely arcuate, not at all produced; costal margin with its distal arcuation to apex shorter and much sharper and more abrupt than in male, sutural margin with its corresponding passage to apex much shorter and more abrupt than in male, although somewhat broader than the costal transition in the present sex; scapular field equal to one-third the tegminal width, anal field shorter and broader than in male, its greatest width equal to but slightly less than half the length of the field (as 4.3 to 9), the general outline of the same as in male but less elongate, the greatest width mesad instead of at two-fifths of the field's length; costal veins eighteen to twenty-one, counting all rami in the scapular field, discoidal sectors ten to eleven in number, anal vein as a whole more generally arcuate and less straight oblique, axillary veins nine in number. Wings with apex bluntly arcuato-truncate, costal veins of all origins eighteen in number, none at all thickened, ulnar vein with five complete (counting bifurcations of one rami each as complete) and one incomplete rami.

Caudo-lateral angles of abdominal tergites two and three subrectangulate, of four and five subacute produced, of six and seven obtuse, of the latter subproduced, surface of seventh tergite simple, unspecialized, its distal margin weakly but appreciably sigmoidally sinuate in each lateral half, mesad the margin being very broadly and extremely shallowly obtuse-angulate emarginate, eighth tergite very narrowly evident, its distal margin transverse truncate except for the moderately acute produced caudo-lateral angles, ninth tergite very narrowly exposed, finely sulcate medio-longitudinally, distal margin transversely arcuato-truncate, caudo-lateral angles hardly at all produced, rectangulate; ultimate tergite (supra-anal plate) appreciably transverse trigonal, its greatest length but slightly more than one-third the greatest proximal width, lateral margins of production nearly straight oblique convergent, apex distinctly and broadly obtuse-angulate emarginate, the resultant bounding lobes rounded, surface of tergite in proximal half weakly subsulcate medio-longitudinally, broad impressed concave areas indicated on each side mesad of the cercal bases; ultimate sternite (subgenital plate) broad, distal margin as a whole broadly arcuate, very faintly sinuate ventrad of the cercal bases.

General color of dorsal surface and much of ventral one ochraceous-buff, washed on disk of pronotum and most of tegmina except marginal and considerable of sutural fields, which are also subhyaline, with pale zinc orange. Dorsal surface of abdomen with a mummy brown discal infuscation of the proximal six tergites, varying from paired intermarginal bandings which are very narrow proximad and expanded and converging on the fifth and sixth tergites, with the seventh more rufescent and occasionally the eighth and ninth largely and the base of the ultimate narrowly mummy brown, to the opposite extreme in which the whole dorsal surface of the abdomen except the pale lateral borders, the distal portion of the ultimate tergite (supra-anal plate) and a restricted subtriangular medio-proximal area are similarly dark, in some specimens the eighth and ninth tergites are as rufescent (kaiser brown) as the seventh tergite, and the dark area proximad on the ultimate tergite is broken in two and represented by paired small dark patches at the lateral bases, lateral pale borders of dorsum pronounced and evident to caudo-lateral angles of ninth tergite, on seventh of male broadened into patches involving all mesad to the oblique swellings of the surface. venter of abdomen pale proximad becoming kaiser brown meso-distad, intermarginal dark bars present and broken into detached blotches on most of the sternites, these varying in size and exact shape, distal margins of sternites regularly beaded with pale ochraceous-buff and the darker color, ultimate sternite (subgenital plate) of female marked marginally with mummy brown, cerci mummy brown, occasionally paler distad. Head with interocular bar relatively deep, in tone prout's brown to mummy brown, eyes bister to mars brown, antennae pale proximad becoming progressively more tawny distad, palpi pale, rarely the ultimate article is infuscate distad with mummy brown. Limbs of the pale color with tibial spines pale tawny.

But one of the males seen has the dorsum of the abdomen largely infuscate, this being from Morogoro, while the females are either extremes of that type or closely approach that condition. The three males with the pronounced infuscation of the eighth and ninth abdominal tergites are two from Lulanguru (one the type) and one from Morogoro. Whether there is a regional correlation of this latter condition remains to be determined when more material is available.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂					
Lulanguru, Tanganyika, *type*	15.3	3.94	5.7	15	5.2
Lulanguru, Tanganyika, *paratype*	16.4	3.86	5.53	16.1	5.62
Between Tabora and Kigoma, Tanganyika, *paratype*	15.2	3.94	5.7	15	5.2
Morogoro Tanganyika, *paratype*	13	3.94	5.95	13.2	—[27]
Bua River, Nyasaland	13.8	3.94	5.7	15.7	5.2
♀					
Lulanguru, Tanganyika, *allotype*	17.2	4.11	5.04[28]	13.2	5.12
Lulanguru, Tanganyika, *paratype*	15.2	4.03	6.12	13.3	4.87
Usangu District, Tanganyika	12.7	3.61	5.12	10.3	3.69

In addition to the type and allotype of *selousi* I have before me a series of seven males and three females of which three males and two females are considered paratypes. These specimens are from the following localities:

Lulanguru, seventeen miles west of Tabora, Tanganyika. December (one dated 3-25), 1917. (G. D. H. Carpenter.) One male, two females (*paratypes*). [Brit. Mus. Nat. Hist.]

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[27] The tegmina are badly curled and width measurements not possible.

[28] The lateral areas are slightly more declivent than normal and this width should be slightly greater in an uncompressed specimen.

Between Tabora and Kogoma, Tanganyika (Lt. Stamper) One male (*paratype*) [Mus Belg Congo]

Morogoro, Tanganyika January 4, 1911. (A. Loveridge) One male (*paratype*) [Nairobi Museum]

Usangu District, south-central Tanganyika. Elevation, 3500–4500 feet November 29 to December 15, 1910 (S A Neave) One female [Brit. Mus Nat Hist]

Mzimba (labelled Mazimba), Nyasaland, November 24, 1910 (Dr. J E S Old) One male [Brit Mus Nat Hist]

Bua River, Nyasaland November 29, 1910 (Dr J E S Old) One male [Brit Mus Nat Hist]

Zomba, Nyasaland February, 1911 (Dr J E S Old) Two males [Brit Mus Nat Hist]

From these specimens it is evident that regionally we may find marked size fluctuation and that individual variation appears to be but slight, the size of the western Tanganyika individuals being surprisingly uniform The female from the Usangu District is very small, as the above measurements show, and at a casual glance would, for this reason, be considered to represent a different species Comparison, however, discloses the identity of the specimen with the other individuals of *selousi*

The distribution of this species is quite interesting in that while *jallae* occurs in northeastern Rhodesia and up into Katanga, *selousi* apparently replaces it in most of Nyasaland, yet both occur in the southern part of that protectorate It is the only species of *Euandroblatta* known to occur in Tanganyika, and in that direction it defines the northeastern limit of the range of the genus However, further work may show that *selousi* occurs in portions of southern Kenya

Euandroblatta clavigera,[29] new species Plate 8, figs 16-18

This species, which has strikingly distinctive male genitalic features, needs comparison only with *E marshalli*, described on a subsequent page In size it is a large species bearing a marked superficial resemblance to *E jallae* One glance at the ultimate sternite (subgenital plate) of the male shows the two species are not closely related, the median portion of this being broadly and rather evenly arcuate, the dextral style short and simple, while the sinistral one is strongly arcuate at the base and then developed into a nearly straight, expanding, distally rounded, club-like structure, in no way like the tapering style of *jallae* The margin of the sternite dorsad of the base of the sinistral style shows no approach to the rectangulate expansion of this area seen in *selousi* In *marshalli* the dextral style is the highly modified one, but in that species, which is also much smaller and proportionately more slender, the sinistral style is far longer than the dextral style is in *clavigera*, in fact much like the sinistral style seen in *selousi*.

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[29] In allusion to the club-like sinistral style of the male ultimate sternite

Type — ♂ , On railroad 311 kilometers (approximately 190 miles) from Kindu,[80] Region of the Lualaba River, Belgian Congo At night (Dr. Russo) [Museum of the Belgian Congo]

Size relatively large (for genus), form with well developed tegmina and wings much surpassing abdominal apex, surface moderately polished

Head rather narrowly visible cephalad of pronotum as seen from dorsum, in cephalic aspect cordiform, very slightly deeper than width across eyes (as 10 8 to 10 3), occipital line as seen in cephalic view weakly arcuate, its curvature evenly continuing that of the eyes, interspace between eyes contained one and three-fourth times in that between internal margins of antennal scrobes palpi of the type usual in the genus, ultimate article one and three-fifth times in the greatest (extensor) length of penultimate article, the latter short and broad infundibuliform, its greatest distal depth slightly less than one and one-half times the extensor length of same, penultimate article approximately four-fifths as long as ultimate one (as 3 3 to 4) antennae distinctly surpassing the body in length

Pronotum trapezoidally semi-ovate, with its greatest length contained slightly less than one and one-half times in its greatest width, which is at the caudal third cephalic margin arcuate, passing into the obliquely and moderately arcuate, caudad divergent lateral margins without appreciable intervening angles, lateral angles rounded obtuse, caudo-lateral margins short, convergent arcuate, passing by definite but obtuse and rounded angles into the very low arcuate caudal margin, all margins of pronotum narrowly cingulate, slightly heavier laterad than elsewhere surface of pronotum with disk subdeplanate, appreciably declivent laterad

Tegmina elongate elliptico-lanceolate, greatest median width contained two and four-fifth times in the greatest length of same, apices surpassing that of abdomen by a distance nearly equal to the pronotal length costal margin moderately arcuate in proximal two-fifths and strongly so in distal sixth, between nearly straight, apex narrowly rounded, sutural margin in large part nearly straight, very briefly arcuate proximad, much more obliquely arcuate in distal fourth to apex marginal field of moderate width, its greatest breadth contained four and one-half times in the length of the field and equal to one-third the greatest width of the anal field, apex of marginal field distinctly failing to reach as far distad as the apex of the anal field, scapular field at widest point equal to two-fifths the total tegminal breadth; anal field elongate subpyriform, its greatest length equal to two and one-sixth times its greatest width mediastine vein nearly straight oblique, faintly inbowed in proximal half, ventrad markedly lamellato-elevate, costal veins twenty-three in number, including bifurcations as individual counts, oblique, straight, becoming sublongitudinal distad, humeral trunk appreciably arcuate in proximal half, discoidal sectors of all origins ten in number, longitudinal, the longer ones appreciably arcuate toward humeral trunk in their proximal halves; anal vein not at all sigmoid, the arcuation of the proximal half followed distad by a straight oblique section, which passes by a narrowly rounded but distinct obtuse angulation to a short straight distal portion, which joins the sutural margin at a right angle situated at two-fifths the length of the margin, axillary veins eight in number Wings with apex of same outline as tegminal apex costal veins of all origins twenty in number, six or so mesad very faintly thickened, in no sense clavate, all oblique, medio-humeral and medio-ulnar areas narrow, subequal in width, both divided by rather poorly marked cross-veins into rectangulate areolets, ulnar vein with six complete and two incomplete rami, all simple in character

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[80] This would be about forty kilometers northwest of Kongolo, near the boundary of the Stanleyville and Katanga Provinces The line is at approximately three hundred kilometers from Kindu

Abdominal tergites two to six with caudo-lateral angles produced, progressively less marked from rounded acute (proximad) to subrectangulate (sixth), seventh tergite with lateral margins distinctly subarcuate convergent distad, the caudo-lateral angles obtuse, distal margin as a whole concave, surface of tergite mesad impressed concave with glandular area almost hidden under sixth tergite,[31] bounded laterad by subparallel sub-longitudinal low rounded ridges, which near the distal margin are joined by similar but more decided oblique, straight convergent folds, which mark off relatively broad lateral areas which are subdeclivent and appreciably concave, eighth tergite almost hidden under seventh, its distal margin broadly concave, ninth tergite very short, its distal margin transverse truncate in median half, the caudo-lateral angles strongly produced, acute, the border of their internal side subsigmoid ultimate tergite (supra-anal plate) produced trigonal, the production roughly equilateral, the converging margins straight, apex blunt, very shallowly arcuate-emarginate, surface at the proximal sixth with a transverse impression, production evenly decurved distad ultimate sternite with its median exposed length but slightly greater than the proximal width, interstylar section produced in a slightly asymmetrical strongly arcuate lobation, the ventral surface of which is ovate deplanate to appreciably proximad of the axis of the stylar sockets and as a whole contrasted with the evenly transverse arcuate more proximal portion of the sternite, the line between the two areas not at all sharply defined dextrad, but sinistrad the definition is by a subcarinate and arcuate ridge, sockets of both styles rectangulately incised in the margin of the sternite, the sinistral distinctly larger than the dextral, dextral style short, its length about three times its basal width, simple, tapering, virtually straight, subspiniform acute at apex, surface with a number of short chaetae, sinistral style an elongate clavate appendage many times the size of the dextral style, more slender at base than in distal three-fifths, moderately arcuate in proximal half, straight distad, when directed mesad extending across nearly three-fourths of the sternite's width, apex bluntly rounded and with several recurved teeth, the dorsal surface with the greater part of its length rather closely armed with similar recurved teeth and a few scattered elongate chaetae cerci incomplete.

Limbs moderately robust cephalic femora with ventro-cephalic margin having thirteen spines in its series, from the three large distals evenly lengthening proximad until the four proximal ones are but slightly shorter than the third (from apex) of the distal group, ventro-caudal margin with five spaced spines, increasing in length distad arolia large, tarsal claws strongly unequal, caudal tarsi lacking

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[31] The type being unique I have not endeavored to relax the abdomen in order to ascertain more exactly the conformation of the gland area.

General color ochraceous-buff, pronotal disk slightly darker Head with broad interocular bar of mummy brown, antennae becoming tawny mesad, palpi of general color; eyes dresden brown to mummy brown Pronotum with a ghost lyrate pattern of darker muscle attachments, usual paired oblique dashes distinct, hooked latero-caudad, prout's brown Dorsum of abdomen largely mummy brown distad to sixth tergite, much paler mesad and narrowly edged laterad with dull tawny, seventh and more distal tergites dull zinc orange, the base of the ultimate tergite and virtually all of the narrow eighth and ninth approaching mummy brown, venter of abdomen kaiser brown mesad, laterad passing broadly to mummy brown, ultimate sternite (subgenital plate) of the paler shade, cerci (as far as preserved) deep fuscous.

Length of body, 15 1 mm , length of pronotum, 4 11, greatest width of pronotum, 6 04, length of tegmen, 17, greatest width of tegmen, 5 87

The type of this most distinctive species is unique and the female sex not as yet known

Euandroblatta marshalli,[82] new species Plate 8, figs 19-22

This species needs comparison only with the preceding one (*E clavigera*), in the diagnosis of which will be found comments on the genitalic differences of the males of the two species *Marshalli*, however, also differs from *clavigera* in its distinctly smaller size and more slender form, at least in the male sex, the female of the latter species not being known at this time.

Type — ♂ , Salisbury, Mashonaland, Southern Rhodesia January, 1906 (G A K Marshall) [British Museum of Natural History.]

Size relatively small (for genus) form elongate and slender, less robust than the other species, tegmina and wings elongate, surpassing apex of abdomen surface distinctly polished

Head visible cephalad of pronotum for entire width as viewed from dorsum; in cephalic aspect the head outline is elongate cordiform, the greatest depth slightly greater than width across eyes (as 8 5 to 8), the exact half ventrad of the eyes with the lateral margins regularly and straight convergent to the narrowly rounded extremity of the labrum occipital outline as seen in cephalic aspect evenly arcuate with the curvature of the eyes, interspace between eyes equal to but slightly more than a third that between internal margins of antennal scrobes (as 1 2 to 3 3): palpi damaged [83] antennae lacking

Pronotum in general outline subtrapezoidal semi-ovate, its greatest median length contained twice in the greatest width, which is at caudal third cephalic margin broadly arcuate, rounding laterad without delimiting angles into the obliquely diverging, but faintly arcuate lateral margins, which pass by the narrowly rounded lateral angles into the brief and subarcuate, convergent caudo-lateral margins, these in turn virtually continuous with the gently arcuate caudal margin. surface of disk broadly deplanate, laterad rather narrowly and but moderately declivent

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[82] Dedicated to Sir Guy A K Marshall, Director of the Imperial Institute of Entomology, in appreciation of his entomological labors in Africa, which have helped so materially to increase our knowledge of the insect life of that continent

[83] See description of allotype

Tegmina narrowly lanceolate, margins subparallel for a considerable part of the length, surpassing apex of abdomen by a distance appreciably greater than the pronotal length, greatest width contained nearly three and two-fifth times in the tegminal length costal margin virtually straight except for the arcuation of the proximal fourth and of the distal fifth; apex very narrowly rounded, sutural margin with a brief proximal arcuation and a broader curve to the apex in the distal fourth, the remainder virtually straight marginal field very narrow for the genus, its greatest width less than a sixth the length of the field (as 2 to 13) and two-sevenths that of anal field, apex of marginal field failing to reach as far distad as apex of former field, scapular field with width equal to slightly less than three-sevenths of total width of tegmen, anal field very slender and elongate, attenuate subpyriform in shape, its greatest width contained almost three times in the length of the field (as 3.5 to 10). mediastine vein distad of proximal sixth straight oblique; costal veins of all origins and characters nineteen to twenty-one in number, the more proximal ones distinctly arcuate, humeral trunk straight except for usual arcuation of proximal third; discoidal sectors of all origins longitudinal in general direction, nine in number, anal vein nearly straight longitudinal in proximal third, then broadly and gently arcuate to an oblique, nearly straight section which by a short and relatively abruptly hooked falcation joins the sutural margin at two-fifths of the tegminal length, axillary veins closely placed, seven in number, as in discoidal field with well-marked longitudinal intercalated nervures Wings with apex well rounded, costal veins of all origins sixteen in number, non-clavate, a group of eight faintly thickened, medio-discoidal and medio-ulnar areas subequal in width, divided by cross-veins into numerous quadrate or rectangulate areolets, ulnar vein with four complete and one incomplete rami

Abdominal tergites two to six with the caudo-lateral angles moderately acute produced seventh tergite longer than sixth, caudo-lateral angles not at all produced, subobtuse, distal margin low convex mesad, faintly and broadly concave each side of same, glandular impression occupying slightly more than half of the width of the more proximal part of the tergite, laterad the impression is markedly concave-excavate, while mesad it bears a transverse structure much as described for *E. selousi*, but in the present species this is lower, more strongly transverse, much less excavate disto-ventrad, and lacks on its dorsum a medio-longitudinal carinula, while its thickened margin is subconcave when seen from dorsum, surface of tergite immediately distad of glandular area structure with numerous very fine shagreenous points, the above mentioned concavities defining the glandular impression laterad are bordered laterad and caudad by converging low sigmoid swellings, which fail to reach the distal margin and cut off the relatively broad and subconcave lateral sections of the tergite from the central specialised area: eighth tergite relatively short, caudo-lateral angles rounded obtuse, lateral margins arcuate, distal margin arcuato-truncate ninth tergite with exposed surface longer than that of eighth, caudo-lateral angles acute produced, lateral margins virtually straight, subparallel, distal margin convex mesad, concave laterad of the central section ultimate tergite (supra-anal plate) almost equilaterally trigonal, greatest median length slightly greater than half the proximal width of tergite between cercal bases, lateral margins of production in greater part straight oblique convergent, apex rather broadly rounded, surface of tergite shallowly impressed medio-longitudinally, in proximal half there are two closely placed converging narrow sulci enclosing a low carinulate area, in distal half a single fine sulcus is indicated ultimate sternite (subgenital plate) moderately asymmetrical, in general proportions transversely rectangulate, its greatest exposed length equal to five-eighths the greatest width, distal margin with an interstylar arcuate lobation, which is situated distinctly dextrad of the median line, the shape of the distal margin reading sinistrad from the disto-dextral angle being as follows—angle roundly lobate, the lobe subvertical in position, dextral stylar socket deeply excavate, arcuate-rectangulate in outline, thence sinistrad to the much broader and shallower sinistral stylar base extends the interstylar lobation of the margin which is equal to almost half the total width of the sternite, is evenly arcuate sinistrad and arcuato-sinuate dextrad, a sinistral super-stylar supplementary lamellation present as in *E selousi* but much less prominent than in that species, its distal margin subtruncate and lateral angle obtuse, its border with radiating short chaetae, but no teeth, disto-sinistral angle of margin of sternite arcuately sublobate as is disto-dextral but less produced, surface of sternite undulately subconcave in all of distal half between cercal bases, dextral style greatly elongate, slender, falcate, reaching sinistrad across distal margin to distad of extreme sinistral side of base of sinistral style, not at all clavate but of even width, at base quite sharply bent arcuate, thence broadly arcuate, apex subacute, in section most of the style is subcircular but appreciably deplanate proximad, sinistral style hardly more than half the total length of the dextral but of the size and general character found in a number of the other species of the genus, being directed mesad, gently arcuate, subdepressed, subequal in width in approximately two-thirds of its length, moderately tapering in distal third, apex bluntly rounded, dorsal margin of extensor face with a series of eight recurved spiniform teeth, the most distal close to the apex cerci elongate, slender, tapering, little broadened, in an incomplete condition surpassing apex of ultimate tergite by at least the length of the latter

All limbs relatively slender Cephalic femora with ventro-cephalic margin bearing sixteen spines, the sixth from the distal end the shortest, thence in both directions they regularly increase in length the largest proximad subequal in length to the second from the distal extremity, the distal spine very long, slightly more than twice as long as the second, ventro-caudal margin with four spaced spines cephalic tibiae quite slender, subequal in width except for brief proximal narrowing Caudal tibiae much narrower than usual in genus· caudal tarsi with proximal article slightly longer (one and one-fifth times) than the remaining articles combined, pulvillus distad, tarsal claws unequal, arolia large.

Allotype —♀, Salisbury, Mashonaland, Southern Rhodesia (G A K Marshall) [British Museum of Natural History]

The following features are those of noteworthy difference from the above description of the male (type).

Size relatively small, form robust, much more so than general build of male, tegmina and wings relatively short, distinctly failing to reach the abdominal apex

Head with interocular space almost equal to three-fourths that between internal margins of antennal scrobes (as 2 6 to 3 6) palpi with extensor length of ultimate article equal to one and one-half times the same length of the penultimate article, in profile elongate subsecuriform, penultimate article short infundibuliform, its greatest distal depth equal to half of the extensor length, antepenultimate article straight, slender, its length equal to five-sixths of extensor length of ultimate article and its depth not quite equal to a fourth its length antennae incomplete.

Pronotum relatively narrower and more trapezoidally, less semi-ovate than in male, the greatest median length contained slightly less than one and one-half times in the greatest width of the same cephalic margin more definitely delimited from the lateral margins than in male, a broadly rounded but still appreciable transition being evident, lateral margins less strongly oblique and slightly more arcuate than in male, caudo-lateral margins more distinctly convergent than in male and virtually continuous with the caudal margin, which itself is faintly obtuse-angulate mesad surface of disk faintly more arcuate and more definitely cucullate laterad than in male

Tegmina failing to reach apex of abdomen by a distance equal to two-thirds the pronotal length, in outline elliptico-lanceolate with apex blunt, greatest width contained two and one-half times in the tegminal length. costal margin evenly arcuate throughout, rounding a little more strongly distad to the relatively broad apex, sutural margin distad of anal vein straight, toward apex like sutural rounding but a little more sharply, while usual proximal arcuation is distinct but brief, anal field section of this margin faintly arcuate marginal field of but moderate width, its greatest breadth not more than one-fifth the length of the field and one-third that of anal field, scapular field with width equal to two-fifths that of entire tegmen, anal field of same general shape and character seen in male but less strongly attenuate, its greatest width contained two and two-fifth times in the length of the field (as 3 5 to 8 5)· costal veins of all characters and origins nineteen in number, humeral trunk slightly arcuate in proximal two-thirds, discoidal sectors of all origins eight in number, in distal part longitudinal; anal vein in general contour as in male but less sharply hooked distad and joining sutural margin at a right angle very faintly distad of middle of margin, axillary veins as in male Wings damaged in allotype.

Abdominal tergites not at all distinctly produced caudo-laterad, surface of none glandularly specialized, distal margin of sixth tergite evenly concave, of seventh transversely weak bisinuate, the caudo-lateral angles obtuse, distal margin of eighth tergite transversely truncate, the caudo-lateral angles rounded obtuse, distal margin of ninth tergite faintly arcuate, ultimate tergite (supra-anal plate) low trigonal, the median length equal to three-eighths the proximal width, the lateral margins oblique subconcave convergent, the apex with a shallow but very definite obtuse-emargination, the resultant low lobes rounded, surface of tergite concave excavate on each side of a median area. ultimate sternite (subgenital plate) broadly arcuate distad. cerci damaged

Cephalic femora with fourteen spines in ventro-cephalic series; caudal tarsi damaged.

General color of dorsal surface ochraceous-buff with a definite wash on the pronotal disk, occiput and most of the tegmina, except the marginal field and (in the male) the more proximal border section of the scapular field, of pale ochraceous-orange, the pronotal disk with very faint intimations of the oblique lines indicated at its cephalic border in most of the species of the genus, limbs (with coxae) and face as well as antennae (as remaining) and palpi ochraceous-buff, eyes mottled dresden brown to mummy brown, interocular bar prout's brown, sharply defined ventrad, blending dorsad. Abdomen with pale base color ochraceous-buff, faintly washed with zinc orange in male, on the dorsum this being limited to moderately broad lateral borders, distinctly broadening distad and reaching to disto-lateral angles of ninth tergite, disk of dorsum of abdomen of female almost solidly mummy brown, a median pale area on the three proximal tergites narrowing distad, the ultimate tergite solidly dark except for a pale distal section, male with the discal infuscation of the female represented by broad distad convergent bars which reach to the seventh tergite, fading on the lateral parts of the glandular area, the remainder of the apex of the abdomen pale, ventral surface in both sexes with broad pale borders extending distad to the cercal bases, these bordered mesad by mummy brown this paling in median area to hays' russet, the ultimate sternite of female, except for pale lateral borders, almost uniform mummy brown, in the male the ventral dark bars becoming obsolete on the sixth sternite, the whole median area is ochraceous-buff washed with ochraceous-orange, cerci of male (lacking in female) dull zinc orange. Limbs pale with tibial spines inclined toward tawny.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, type	13.6	2.85	4.28	15.2	4.2
♀, allotype	13.2	3.27	4.78	9	3.61

The type and allotype are all I have seen of this most striking and distinctive species. The sexes show the most pronounced sexual dimorphism to be found in the genus. In the absence of further information it is not possible to make any estimate of the extent of its distribution.

PANCHLORINAE

The Species of Leucophaea

LEUCOPHAEA Brunner

1865. *Leucophaea* Brunner, Nouv. Syst. Blatt., p. 278.
1892. *Rhyparobia* Krauss, Zoolog. Anzeiger, XV, p. 165. (Based solely on *maderae*.)

Genotype (by designation of Rehn, 1903[34]).—*Leucophaea maderae* (Fabricius) [*Blatta maderae*].

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[34] Trans. Am. Entom. Soc., XXIX, p. 282, (1903).

The genus *Leucophaea* is clearly of African origin, although its best known and most widely distributed species (*maderae*) has been carried by commerce over a considerable portion of the tropical and subtropical world, where it is established as a domiciliary pest However, as shown on a following page, under *maderae*, that species' distribution as of to-day is by no means universal over the warmer regions of the world, and may, with that of certain other blattids generally assumed to be circumtropical in distribution, furnish interesting evidence on the historical side of man's unwitting agency in the spread of species which have acquired domiciliary habits

From the evidence of its relatively general occurrence in tropical Africa, and its much more localized distribution in many other portions of the tropics, taken with the associated presence of closely related species in portions of West Africa, I feel *maderae* had its origin in that territory, possibly in that portion usually spoken of as Upper Guinea Slave ships in colonial times brought the species from the Guinea coast to the West Indies and coastal Brazil, where it is now common and general in occurrence, although elsewhere in tropical America much more irregularly distributed

I have before me material of six species of the genus *Leucophaea* from Africa, these probably representing all the known forms referable to the genus Arranged in a linear sequence they show a transition from one extreme having a moderately deplanate pronotum with its latero-cephalic portions gently oblique declivent ventro-cephalad, to an opposite one in which the whole pronotum is heavier, subcucullate and with its low arcuate disk passing regularly into the arcuate declivent latero-cephalic sections The two extremes, on casual examination, appear very different, but a more detailed study of all the species shows very little which could be utilized as characters for further generic division

The order in which I would place the species is, *thoracica* (Kirby), *puerilis* new species, *maderae* (Fabricius), *congicus* new species, *grandis* (Saussure) and *capelloi* (Bolivar) The first mentioned represents the extreme with the more deplanate pronotal disk, while *capelloi* has the heavy subcucullate type

The following key is a purely artificial one, based in part on color characters, but should prove of service in differentiating the species now known which are clearly referable to the genus A number of other species have been referred to *Leucophaea* (usually as *Rhyparobia*) by various authors, but more recent work has made evident their correct generic associations.

1. Pronotum solidly pitch black Tegmina markedly bicolored by contrasted blackish areas on a pale ground, or at least areas of concentrated blackish punctae producing a bicolored effect, in either case one blackish group present distad in the ulnar field, another midway between that point and the apex Body and limbs solidly blackish 5

Pronotum not solidly pitch black, its base color usually light, and always with a more or less evident lyrate pattern of darker maculations. Tegmina never solidly bicolored, anal area always lacking a large dark patch, the discoidal field showing with greater or lesser emphasis a multi-tessellate dark pattern on a pale group, never solid in its maximum intensification. Body and limbs almost invariably not solidly blackish[35] 2

2. Size smaller (length of prontum, 6.3 to 10 mm., length of tegmen, 28.8 to 41) 3

Size larger (length of pronotum, 12 to 13.2 mm., length of tegmen, 43.3 to 59.5) 4

3. Average size smaller (length of pronotum, 6.1 to 7.6 mm., length of tegmen, 28.8 to 35.2). Marginal field of tegmina narrower, anal field of same more elongate pyriform. Limbs proportionately shorter and more robust . . . . *puerilis*, new species

Average size larger (length of pronotum, 8.3 to 10 mm., length of tegmen, 33 to 41). Marginal field of tegmina broader, anal field of same broader, more semi-elliptical, less pyriform. Limbs proportionately longer and more slender . . . . *maderae* (Fabricius)

4. Interocular space broader. Tegmina with the area of the humeral trunk in large part washed with a longitudinal fuscous cloud, the areolation of the discoidal field more densely fuscous, clearly areolate, but less tessellate in appearance. Caudal tarsi with proximal article more elongate, equal to two-fifths of tarsal length. Ultimate tergite (supra-anal plate) of female broader, divided, marginally subtransverse crenulato-truncate, ... *congicus*, new species

Interocular space narrower. Tegmina with the area of the humeral trunk infuscate only in proximal portion, and then definitely marked and not at all clouded, the areolation of the discoidal field much less dense, contrastingly tessellate[36]. Caudal tarsi with proximal article stouter, equal to one-third of tarsal length. Ultimate tergite (supra-anal plate) of female narrower, roundly bilobate, marginally not at all subtransverse or crenulato-truncate . . . . *grandis* (Saussure)

5. Pronotum distinctly deplanate, not transversely arcuate subcucullate. Tegmina with texture more delicate and membranous, blackish pattern of same of solid character, not concentrated punctae . . . *thoracica* (Kirby)

Pronotum not at all deplanate, transversely arcuate subcucullate. Tegmina with texture heavier and more coriaceous, blackish pattern of same less solid, usually distinctly made up of concentrated punctae, the latter component elements always evident . . . *capelloi* (Bolivar)

It is not feasible at this time to attempt a comprehensive study of generic relationships of the genera contained in the Panchlorinae, and in consequence a full analysis of that type must await future study. It suffices to say, however, that *Leucophaea* is more nearly related to *Nauphoeta*—

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[35] In rare intensive individuals of *maderae* the ventral surface is nearly solid blackish, but this is by no means the norm of the species, and this condition is accompanied by the most intensive concentration of the blackish areolation of the tegmina seen in *maderae*.

[36] By recession this tessellation is occasionally sparser, weaker and less extensive than in other individuals. However, there is no possibility of confusion of such specimens with *L. congicus*.

similarly an African genus—than it is to *Pycnoscelus*, with which it is generally associated The interrelations of these genera, *Panchlora*, *Pronauphoeta*, *Heminauphoeta* and the American *Tribonium* complex are by no means simple, and a true understanding of their affinity will be secured only after detailed study Whether present generic lines in this group are natural or purely artificial also must be determined

Leucophaea thoracica (Kirby)

1903 *Rhyparobia thoracica* Kirby, Ann and Mag Nat Hist, (7) XI, p 404 [♀, Ntunda, Shire River, Nyasaland]

Belgian Congo Kiambi, Tanganyika-Moero District, July 20, 1911, (Dr Valdonio), one male, [Mus Belg Congo]

Tanganyika Territory Morogoro, 1912, (K Schwarze), one male; [Dresden Mus]

Southern Rhodesia Umtali, January, 1932, (P A Sheppard), one male, [Transvaal Mus]

Chopard [37] has already figured this species and called attention to the amount of variation occurring in the blackish markings of the tegmina In the Kiambi male the two large blackish areas are completely separated on the sinistral (upper) tegmen, there being no connecting line of areolations, while the usual dextral blotch is completely absent from the dextral (under) tegmen In the Umtali male both blotches are connected by a very definite and nearly (dextral) or quite (sinistral) solid group of areolations, narrower, however, than in the specimen figured by Chopard The distal blotch on the dextral tegmen is, however, marked, but not more than half as broad as that on the sinistral tegmen The proximal margin of the distal blotch is transverse truncate in the Umtali specimen and quite irregularly arcuate in that from Kiambi

The range of the species is now known to extend from the southwestern portion of Kenya Colony (Amala River, Sotik, and Lemek Valley, Nyanza District, both reported by Chopard in 1921) and eastern Katanga (Kiambi), Belgian Congo, south to Nyasaland (Shire River) and the eastern portion of southern Rhodesia (Umtali)

Leucophaea puerilis, new species Plate 9, figs 26 and 27

Closely related to *L maderae*, of which at first glance the present species would appear to be merely a diminutive individual A careful comparison, however, shows that, while *puerilis* is in general a replica of *maderae*, the two are quite distinct and that *puerilis* may be separated from the previously known species by its distinctly smaller size, the definitely narrower marginal field of the tegmina, the more elongate pyriform shape of the anal field of the same, and the proportionately shorter and more robust limbs. This species is clearly an endemic West African close relative of *maderae*, thus pointing out the original home of the latter more widely distributed species The distribution of *puerilis*, as shown below, covers a considerable portion of the West African region between the Ivory Coast and central Gaboon

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[37] Voy de M Babault dans l'Afrique Orient. Angl, Res Scient., Orth, p 18, pl 1, fig 5, (1921).

Type — ♂, Lower Ogowe River, Gaboon, French Equatorial Africa [Hebard Collection, Type no 1267]

Size (for the genus) relatively small, form as in *L maderae*, surface texture somewhat more polished

Head for nearly its entire width visible cephalad of pronotum, interspace between eyes with its least width less than that between ocellar spots

Pronotum in form and sculpture as in *L maderae*, except that in proportions it is more strongly transverse and the lateral angles are slightly sharper, greatest width of pronotum equal to one and one-half times its median length

Tegmina in proportions slightly narrower and more elongate than in *L maderae*, with the wings surpassing the apex of the abdomen by a distance equal to the length of pronotum, greatest tegminal width contained three times in greatest tegminal length, marginal field relatively narrow, its deplanate portion of more uniform width, and with the costal margin of that area distinctly less strongly arcuate than in *maderae*, anal vein less strongly arcuate and the anal field in consequence narrower and more longitudinal pyriform in shape

Genital features as in *L maderae*

Limbs in their entirety stockier, more robust and proportionately shorter than in *L maderae*, all the elements exhibiting this tendency, throughout the tibiae are proportionately broader and the tibial spines and spurs shorter and stouter

Allotype — ♀, same data as type [Hebard Collection]

Differs from the female sex of *L maderae* in the same features given above for the male

In coloration the present species is an exact duplicate of *L maderae*, and a description of its color features would merely be a repetition of those of that very well known species The same amount of recession and intensification of the pattern seen in *L maderae* is to be found in *L puerilis*, the cribrose pattern of the distal half of the discoidal field of the tegmina, the strength of the pencilling of the anal vein of the tegmina and the varying emphasis of the elements of the pronotal markings all are as in *maderae*

MEASUREMENTS (in millimeters)

L puerilis	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂ Dimbokro, Ivory Coast, *paratype*	27 7	6.5	10.5	29.5	9.5
♂, Lolodorf, Cameroons, *paratype*	34 3	6.8	9.9	30	10

MEASUREMENTS (in millimeters)—(*continued*)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
L. puerilis (continued)					
♂, Lower Ogowe River, Gaboon, *type*	32.8	7	11	31.3	10.2
♂, Lambarene, Ogowe River, Gaboon, *paratype*	31.5	7.2	11.3	31	10.1
♀, Liberia, *paratype*	30	7.6	12	35.2	11.7
♀, Efulen, Cameroons, *paratype*	31	6.9	10	28.8	9.8
♀, Lower Ogowe River, Gaboon, *allotype*	30.5	6.3	10	30	9.2
♀, Lambarene, Ogowe River, Gaboon, *paratype*	27.8	6.1	9.2	29	9
♀, Lambarene, Ogowe River, Gaboon, *paratype*	28	6.5	9.8	30	9.8
L. maderae					
♂, Bitje, Cameroons	38	8.5	12.7	30	11.4
♂, Bitje, Cameroons	41.3	9.3	14.8	39	13.5
♀, Bitje, Cameroons	36	8.3	13.5	36.5	12.2
♀, Bitje, Cameroons	40	10	14.5	41	13.5

In addition to the type and allotype I have before me the following adult specimens of *puerilis*, all of which may be considered paratypic.

Liberia, one female, [U. S. N. M.]

Vicinity of Dimbokro, Ivory Coast, 1910, (Capt. Posth), one male, [Paris Mus.]

Duala, Cameroons, October, 1911, (von Rothkirch), one male.

Lolodorf, Cameroons, February, 1925, (A. I. Good), one female, [Carnegie Mus.]

Efulen, Cameroons, November 12, 1920, (H. L. Weber), one female, [Carnegie Mus.]

Lambarene, Ogowe River, Gaboon, French Equatorial Africa, 1911 and 1913, (R. Ellenberger), two males, one female, [Paris Mus.]

Samkita, Ogowe River, Gaboon, French Equatorial Africa, 1910, (R. Ellenberger), one male, [Paris Mus.]

"Congo" 1893, (Guiral), one male, [Paris Mus.].

An immature female individual from Flandria, Equator District, Belgian Congo, March 31, 1932, (R. P. Hulstaert), [Mus. Belg. Congo] is referred to *L. puerilis* on account of the limbs being heavier than in similar individuals of *L. maderae*. It is also smaller than in the same stage of the latter species and has the cerci stouter proximad.

It is evident that *L. puerilis* has a considerable distribution along the West African coast and certainly for at least a considerable distance inland

Apparently it is a truly forest type occurring in both sections of the West African Forest Province Whether the present records encompass all or but a part of the range of the species remains to be determined It is evident, however, that *L puerilis* is by no means as widely distributed in Africa as *maderae*.

The only noteworthy feature of structural variation exhibited by the series is that in the male sex alone the interocular width varies individually from but little narrower than the distance between the ocellar spots, to an opposite extreme in which the interspace is but faintly more than half the same distance Virtually the same fluctuation is seen to occur in series of *L maderae*

Leucophaea maderae (Fabricius) Plate 9, fig 28

1781 [*Blatta*] *maderae* Fabricius, Spec Ins, I, p 341 [Madeira Islands]

Canary Islands Gran Canaria, September, 1894, one male, one female, [U.S N M]

Senegal Dakar, 1911, one male, [Paris Mus] 1907, (Walterlot); one female, [Paris Mus] No exact locality, 1900, (A Chevalier), one immature individual, [Paris Mus]

French Guinea Region of Pita, Fouta d'Jalon, 1910, (H Pobeguin); one female, [Paris Mus]

Sierra Leone 1906, (E Boullet), one female, [Paris Mus]

Upper Volta Region of Lobi, 1906, (Lieut Greigert), one male, [Paris Mus]

French Sudan Shores of the Niger, 1888, (Tetuan), two immature males, one immature female, [Paris Mus]

Ivory Coast 1907, (A Chevalier), one male, [Paris Mus] Vicinity of Dimbokro, 1910, (Capt Posth), one male, one female; [Paris Mus].

Dahomey Vicinity of Zougou-Kuandé, Upper Dahomey; 1908; (Lieut. Brot), two females; [Paris Mus]

Cameroons Batanga, March and April, 1914, (F H Hope), one male, one female, two immature females, [Carneg Mus] Lolodorf, May, 1923; (A. L Good), one female, [Carneg Mus] Ebolowa, May 20, 1932, (H. C. Wing), one immature male, [Carneg Mus] Bitje, Ja River, June, 1909 (dry season), (Bates), five males, eight females, one immature male, one immature female

San Thomé Island Rio de Ouro; 1906, (Ch. Gravier), one male; [Paris Mus] No exact locality, one male, one female.

Spanish Guinea San Benito River, 1885; (Guiral); four males, four females, one immature individual, [Paris Mus].

French Equatorial Africa; Gaboon between Lambarene and the sea; 1901, (E Haug), one immature male; [Paris Mus.]

French Equatorial Africa, Middle Congo vicinity of Brazzaville, 1907, (E Roubaud and A Weiss), one female, [Paris Mus] No exact locality, 1909, (J du Rouchet de Chazotte), one female, [Paris Mus]. Region of N'Ten, Cameroons-French Congo boundary, 1907; (Capt Cottes), one male, one female, [Paris Mus] Region of Ouesso, Sanga River, 1906, (Dr J Gravot), one immature male, [Paris Mus]

Kabinda January, 1933, (Mme Gillardin), one male, [Mus Belg Congo]

Belgian Congo Malela, Lower Congo District, July 5 to 8, 1915, (Congo Expedition, Lang and Chapin), twenty-eight males, forty-one females, twenty-eight immature individuals of both sexes, [A M N H] Boma, Lower Congo District, June 11 to 18, 1915, (Congo Expedition, Lang and Chapin), one immature individual, [A M N H] Mayumbe region, Lower Congo District, (Cabra), one immature female, [Mus Belg Congo] Mushie to Leopoldville, March, 1931, (Lieut J Ghesquiere), one male, [Mus Belg Congo] Lukalela, Lake Leopold II District, one immature female, [Mus Belg Congo] Bongo, Lake Leopold II District, (Cabra), one immature female, [Mus Belg Congo] Moma, Equator District, 1928, one immature female, [Mus Belg Congo] La Molenge, Ubangi District, January, 1930, (H J Brédo), one male, [Mus Belg. Congo] Buta, Uele District, 1925, 1926 and 1930, (R Fr Joseph), three immature males, one immature female, [Mus Belg Congo] Bambesa, Uele District, 1930, (Leontovitch), two males, two females September 25, 1933, (Leferre). one female, [Mus Belg Congo] Dingila, Uele District, June 20, 1933, (H J Brédo), two males, [Mus Belg Congo] Avakubi, Kibali-Ituri District, one immature male, [Mus Belg Congo] Maniema District, (Cuisimer), one male, [Mus Belg Congo] Lusambo, Sankuru District, 1921, (Lieut Ghesquiere), two females, one immature male, [Mus Belg Congo] Lusuku, Lomami District, December, 1930, (P Quarré), one immature individual, [Mus Belg Congo] Kasai District, one immature male, [Mus Belg Congo] Kikole-Luena, Katanga District, February, 1930, (L Courtois), one immature male, [Mus. Belg Congo] Kalassa, November 17, 1912, (Dr J Bequaert), one immature male, [Mus Belg Congo]

Angola N'Dalla Tando, December 29, 1908, one male, one female. Pico Avezedo, July 23 to 27, 1925, one female, [A M.N H] Chitau, August 1 to 12, 1925, one small immature individual, [A.M N H]

Region of the Lakes· (Dr. Sagona), one immature male; [Mus. Belg. Congo].

Uganda Protectorate· Nakaunga, July 16, 1921, (C. H. Lankester), one female.

KENYA COLONY Elgon District, April to May, 1914, (Dr Bayer), one immature female, [Mus Belg Congo]

PORTUGUESE EAST AFRICA Inhambane, December 7, 1912; (K H Barnard), one male, one female, [So Afr Mus] Masieni, August, 1924, (G J Davis), one male, [Trans Mus] Lourenço Marques, February 17, 1928, (C W Howard), one female 1911, (B Paulus), one immature female, [So Afr Mus]

NATAL Durban, September-October, 1907, (G F Leigh), two females, [Trans Mus] May 18, 1914, one male, [Albany Mus]

The above listed detailed records of the African distribution of this supposedly circumtropical species embrace more information on its occurrence in the continental Ethiopian Region than is contained in all the previously published literature Although doubtless increasing its range steadily, this species is less generally distributed than is usually supposed, as is true of certain other widely dispersed domiciliary cockroaches From quite extensive sections of the tropics we have but little or no information as to its occurrence, while in other areas it is almost anywhere

In my opinion the species is a native of West Africa, and its spread into portions of the New World by commerce was chiefly due to the slave trade It is more generally distributed in the West Indies and in certain areas of Brazil than in other portions of the Americas, which would be the natural corollary of introduction dating back to the slave trade

At this writing we have no information on the species occurrence in either of the Rhodesias, Bechuanaland or any portion of the Transvaal. Similarly there is little bearing on its presence in northeastern Africa The records of *maderae* from Madeira, the Canaries, Morocco, Andalusia, Spain and Corsica [38] are readily understandable as due to infiltration in colonial commerce with western Africa From the East Indies past literature gives solely its occurrence in Java (Brunner [39] and Hanitsch [40]) and in the Philippines (Brunner) [39] From the latter archipelago I have seen material taken at several localities The species has also been taken on four of the Hawaiian Islands [41] Its presence in Java and the Philippines can be explained by accidental colonial introduction from Africa, either directly or secondarily from the Canaries or the western Mediterranean region, and in Hawaii by more recent transplanting, probably from the Philippines The absence of the species from India, Australia, southern China and the greater part of Malaysia attests its non-endemism there

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[38] The collection of the Academy contains a male from Corsica, received from De Saussure

[39] Nouv Syst Blatt, p 283, (1865)

[40] Stett Ent Zeit, XCI, p 191, (1930)

[41] All Hawaiian records summarised by Hebard (Occas Papers Bern Pauahi Bishop Mus, VII, p 334, (1922))

Leucophaea congicus, new species Plate 9, figs 23-25

In size equal to *L grandis*, and in linear position between that species and *L maderae*, but nearer the latter From *grandis* it can readily be distinguished by the appreciably broader interocular space, the more evenly arcuate cephalic margin of the pronotum, the larger impressed discal pronotal pattern, the lack of a punctulate tegminal pattern and the presence instead of a broad fuscous wash over much of the discoidal field of the tegmina as well as in the area of the humeral trunk, the proportionately longer caudal metatarsus, and the much broader, divided but quite abruptly subtransverse crenulato-truncate, instead of roundly bilobate, ultimate tergite (supra-anal plate) of the female From *L maderae* the present species can at once be separated by its far greater size, the absence of a punctulate tegminal pattern, and the more robust limbs, while in both of the females of *congicus* before me the pronotum has a general suffusion not seen in any of the large number of *L maderae* here recorded

Type — ♀, Banana, District of Lower Congo, Belgian Congo September 15, 1909 (Congo Expedition, Lang and Chapin) [American Museum of Natural History]

Size large, general form and surface texture much as in *L grandis* except for the more transverse and more rugulose pronotum

Head broad, but slightly deeper than width across eyes, least interspace between eyes hardly more than half that between antennal scrobes

Pronotum transverse, with greatest median length contained almost one and one-half times in greatest width of same, in shape sub-trapezoidally ovate, cephalic margin broadly arcuate between the lateral points of greatest width, weakly flattened dorsad of head caudal margin interhumerally very broadly and weakly obtuse-angulate, short caudo-lateral portions of margin nearly straight, moderately converging caudad from the quite definite but rounded point of greatest width to the weakly marked passage into the caudal margin, narrowly cingulate throughout in transverse section the disk is moderately deplanate, appreciably declivent over the entire lateral areas, surface of pronotum with a weakly impressed and indistinct lyrate pattern essentially as in *L grandis* but of larger size, texture of surface of pronotum impresso-punctulate on dorsum, laterad becoming finely and irregularly wrinkled, with definite transverse fold-like wrinklings in the vicinity of the caudal margin and dorsad of the head, in the latter area more delicately so than in the former, scattered over much of the surface of the entire pronotum are traces of a pattern of low small tuberculiform papillae, obsolete in some areas and clearly evident in others, and when so ranging from infrequent (intermarginally on lateral areas) to rather numerous and closely placed (supra-cervical section)

Tegmina surpassing apex of abdomen by a distance equal to the pronotal length, their length equal to two and one-half times the greatest pronotal width, their width but slightly more than one-third their length; in form, shape of fields and venation the tegmina duplicate on a much larger scale those of *L maderae* Wings when in repose reaching to tegminal apices

Ultimate abdominal tergite (supra-anal plate) broad, transversely subtruncate, immediate margin weakly and irregularly crenulate, shallowly but decidedly V-emarginate mesad Cerci tapering, apices acute, very briefly surpassing ultimate tergite Ultimate sternite (subgenital plate) with form and details as in *L maderae*

Limbs moderately robust, all the femora proportionately deeper and stockier than in *L maderae*, tibiae of all limbs similarly more compressed and broader than in *maderae*, caudal tarsi moderately elongate, distinctly more so than in *L grandis* and similar to those of *maderae*, caudal metatarsi approximately equal to two-fifths the total tarsal length, metatarsal depth contained nearly five times in that length, pulvillus extending virtually to the base (as in *maderae*)

General color between buckthorn brown and dresden brown, the abdomen and limbs ranging from sanford's brown to chestnut, pronotal disk auburn to chestnut Head pitch black with ocellar spots ochraceous-buff, clypeus and mandibles burnt sienna, antennae pitch brown Pronotum weakly of the general color intermarginally between head and humeral angles, immediate margin pencilled with fuscous, in vicinity of caudal margin broadly washed transversely with fuscous, discal pattern but faintly indicated by slightly darker color. Tegmina along humeral trunk very broadly, and distad on anal vein finely, washed with fuscous, almost or quite entire distal half of discoidal field of tegmina broadly and conspicuously washed with the same color Abdomen with distal extremity somewhat darker than remainder Femora and tibiae with flexor and extensor surfaces, and tarsi washed with fuscous, spines chestnut, black tipped

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♀, Banana Belgian Congo, *type*	43[42]	12.2	19.3	49.3	18.6
♀, Faradje, Belgian Congo, *paratype*	56	13	20.2	55	19

In addition to the type I have before me a female from Faradje, Uele District, Belgian Congo, taken January, 1913, by Land and Chapin, and belonging to the American Museum of Natural History This individual, which differs in no essential features from the type, and also greatly extends the range of the species, I am indicating as a paratype.

Leucophaea grandis (Saussure)

1872 *P[anchlora] grandis* Saussure, Mélang Orthopt, II, fasc 4, p 132, pl 10, fig. 46 [♀, Sierra Leone]

IVORY COAST Vicinity of Dimbokro,[43] in 1910; (Capt Posth); one female, [Paris Mus]

GOLD COAST. Obuasi, Ashanti; March, 1916, (D Rafferty), three males; [Carnegie Mus]

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[42] Abdomen retracted

[43] Situated on the railroad into the interior, about 120 miles from the coast at Port Bouet

CAMEROONS Bitje, Ja River, one labelled June-July, 1909, dry season; (G L Bates), one male, two females,[44] one immature female

FRENCH EQUATORIAL AFRICA MIDDLE CONGO Brazzaville, 1919; one immature female

BELGIAN CONGO Boma, Lower Congo District, (R F Achille), one male, [Mus Belg Congo] Lukula, Lower Congo District, April, 1930, (Dr J Stercke), two females, one immature male, [Mus Belg Congo] Leopoldville, Lower Congo District, 1933, (A Tinant), one immature female, [Mus Belg Congo] Kinshasa, Stanley Pool, Lower Congo District, April 11, 1929, (James P Chapin), one male, [A M N H] Kwilu River, Kwango District, 1929, (Mme J Tinant), one female, [Mus Belg Congo]. Equator District, (Verlaine), one female, [Mus Belg Congo] Eala, Equator District, May 15, 1932, (H J Bredo), one female, [Mus Belg Congo] Avakubi, Kibale-Ituri District, December 5, 1909, (Congo Expedition, Lang and Chapin), two immature females, [A M N H] Ruindi, Kibale-Ituri District, July 20, 1931, (J. Wydagh), one female, [Mus Belg Congo] Camp six miles north of Kasenyi, Lake Albert, elevation 2100 feet, August 21, 1934, (George Vanderbilt Afr Exped), one female, twenty immature individuals Lake Bulero, Ruanda, July, 1927, (J Léonard), one male, [Mus Belg Congo]

UGANDA PROTECTORATE Kampala, (Ach Baudit), one male, one immature male, [Geneva Mus] Entebbe, October 10 and 29, 1928, (C R S Pitman), two males, one female, [Hebard Cln] Nimule to Murchison Falls, one male

TANGANYIKA TERRITORY Dar-es-Salaam, November 6, 1926, (A Loveridge), two females, [M C Z]

This large and striking species is now known to occur in a broad belt across central Africa, reaching from Sierra Leone (the type locality) to Dar-es-Salaam and Zanzibar[45] Whether, as suggested by me in 1926, its occurrence at the last locality represents the recent extension of an otherwise West African species, remains to be determined We have, however, no information on the occurrence of the species in East Africa except from points on the line of communication now linking the east coast with Lake Tanganyika The Uganda localities are readily explained by the West African influence there found strongly indicated Except for the Upper Guinea records from Sierra Leone and the Ivory Coast and Gold Coast ones here given, "North Uganda" (Rehn, 1926) is the most northern region from which the species has been recorded Kinchasa and Boma are the most southern localities from which it is known.

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[44] One female has already been reported, Rehn, Arkiv for Zoologi, 18A, no 18, p 16, (1926).

[45] See Rehn, Arkiv for Zoologi, 18A, no 18, pp 16–17, (1926)

The twenty adult specimens now before me show an appreciable amount of size variation in both sexes, the extremes measuring (in millimeters) as follows.

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, Obuasi, Gold Coast	50.5	13	18.5	53	18.5
♂, Bitje, Cameroons	46.5	12	17	48.5	17.5
♂, Boma, Belgian Congo	41.5[46]	12	18.5	43.3	17.2
♀, Bitje, Cameroons	43.5	12.2	17.5	52	18
♀, Zanzibar	55	13.2	19	59.5	20

The Boma specimen stands apart from all the others seen in the shorter tegmina and wings. Apparently, however, this is purely individual, not approached by the male from Kinchasa, which geographically is more nearly comparable. The Boma specimen has been greatly discolored by grease, and efforts to restore its natural coloration have not been fully successful. In all the structural features of importance it is typical *grandis*.

There is a very considerable degree of variation in the extent and depth of the dark brown pattern in this species. On the pronotum this is expressed by a thickening of the lyrate pattern lines and greater solidity of the larger maculations in the more intensively colored individuals. On the tegmina the usual partial pencilling of the anal vein ranges from almost entire absence to heavily indicated on the distal two-thirds of the vein, while the multimaculate pattern of the distal three-fifths of the discoidal field fluctuates from a definite, yet very pale indication, to an opposite extreme in which this pattern is strongly indicated, deep and conspicuous, yet with its individual elements little more numerous than in the pale extreme.

The Kasenyi female, recorded above, was taken in a field camp at light at night and kept alive in a bottle for some days, during which time it gave birth to twenty living young, which are listed with it. These offspring range in length from eight to ten millimeters, and in all well-developed styles are present. It is thus evident that *Leucophaea*, as *Panchlora*, bears living young, probably by the rupturing of a delicate membranous ootheca. It is possible that this condition is more broadly developed in the Blattidae than generally supposed, and that a chitinous ootheca is not the rule in all of the subfamilies.

Leucophaea capelloi (Bolivar). Plate 9, figs. 29 and 30.

1890. *P[anchlora] capelloi* Bolivar, Jornal de Sciencias Mathem. Phys. e Nat. Lisboa, (2), I, p. 78. [♀, Quango [=Cuango or Kwango River], northern Angola.[47]]

1908. *Nauphoeta lunda* Shelford, Deutsche Entom. Zeitschr., 1908, p. 126. [♀; Mpala, [Lake] Tanganyika [, Mocro-Tanganyika District, Belgian Congo].]

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[46] Abdomen deflexed, actual body length somewhat greater.

[47] See Rehn, Proc. Acad. Nat. Sci. Phila., LXXXV, p. 42, (1933), in discussion of *Derocalymma silphoides*, for comments on this locality as used by Capello and Ivens, whose material served as the basis of *capelloi* as well as *D. silphoides*.

Belgian Congo. Niangara, Uele District, November, 1910, (Congo Expedition, Lang and Chapin), one male, [A M N H] Dingila, Uele District; June 20 (adult) and July 7, 1933, (H J Bredo and J V Leroy), one male, one immature female, [Mus Belg Congo] Kafakumba, Lulua District, April, 1933, (G F Overlaet), two males, [Mus Belg Congo] Tshende-Mushyi River, Lulua District, February, 1932, (G F Overlaet), one male, [Mus Belg Congo] Kapanga, Lulua District, 1931, (G F Overlaet), one immature male, [Mus Belg Congo] Elizabethville, Katanga, one female, [Mus Belg Congo] Luputa, Katanga, June 1930, (Ch Seydel), one female, [Mus Belg Congo] Kilometer 109 from Tenke toward Dilolo, Upper Luapula District, Katanga, April, 1932, (Dr Ritschard), one female, [Mus Belg Congo]

Uganda Protectorate No exact locality, 1909, (E Brown), one female, [Hebard Cln] Mityana District, (C H Lankester), one female

The synonymy of *lurida* under *capelloi* is beyond question The general build and color pattern of this species is unusually distinctive and unmistakable There is a superficial suggestion of *Leucophaea thoracica* Kirby in the contrast of pronotum and tegminal base color and maculations, but the pronotal shape and character, the tegminal texture and the areolation of the tegminal blackish pattern are quite different

In my opinion *capelloi* could not be placed in *Nauphoeta* without doing violence to the cohesiveness of that genus, which has a readily recognizable ensemble most difficult to define in words It is clear, however, that *Leucophaea* and *Nauphoeta* are more closely related than would be assumed from the usual arrangement of these genera

The literature supplies no record of this species other than the two given in the above synonymy These with the localities here presented show that the species is one of quite extensive distribution, which in large part encircles the Lower Guinea Forest District, and extends from Niangara in the Savanna region of the upper Uele, east to the north shore of Lake Victoria in Uganda, south to the western shore of Lake Tanganyika, and then westward across Katanga, Belgian Congo to northern Angola at the Kwango River With but eleven exact localities to draw upon, a more detailed statement of the distribution is not possible

Notes on Panchlora and Pronauphoeta

PANCHLORA Burmeister

Four native species of *Panchlora* have been described from Africa and one presumably American form recorded as *viridis* Burmeister has been questionably reported from the Cameroons Of the native species I have before me three, i e. *stolata* Borg, *vosseleri* Shelford and *stanleyana* Rehn

I have seen no material clearly referable to *P camerunensis* Borg,[48] which was erected on the very dangerous basis of a single female I say this advisedly, knowing from the experience acquired in handling large series of the American species of the genus, both in the field and in the laboratory, the variation there found within specific limits Borg's *camerunensis* is stated to have an immaculate pronotum and the antennae are, apparently, unmarked with fuscous, while the distal portion of the tegmina is said to bear a number of blackish points Aside from color there is nothing in the original description except size of any assistance in locating the species.

Panchlora vosseleri Shelford

1908 *Panchlora vosseleri* Shelford, Jahrbuch Nassauisch Ver Naturk Wiesbaden, LXI, p 38 [♀, Amani, Tanganyika ("German East Africa")]

TANGANYIKA TERRITORY Amani, Usambara Mountains, November 26, 1926, (A Loveridge), two males, one female, [M C Z and A N S P]

Among the African species *vosseleri* can at once be recognized by the lateral black pencillings of the pronotum, which are still very definitely marked in these topotypic specimens which have been dried after alcoholic preservation When compared with *stanleyana* the male of *vosseleri* can at once be distinguished by the far longer, yet equally slender, styles of the ultimate sternite (subgenital plate), as well as the longer, narrower and more gradually tapering cerci of the same sex In addition the caudal limbs, and particularly the tibiae and tarsi, are more slender and elongate in *vosseleri*

It is probably *vosseleri* is limited to the mountain forest area on the Usambara Mountains As it is the sole truly East African member of an otherwise West African group, this is probably a relict condition which is mirrored in the distribution in the same territory of many other forms of life of West African affinity

Panchlora stanleyana Rehn

1931 *Panchlora stanleyana* Rehn, Proc Acad Nat Sci Phila, LXXXIII, p 378, pl 34, figs 5-7 [♂, ♀, Bitje, Ja River, Cameroons (type locality), Aburi, Gold Coast, Mulange, Mitvana and Entebbe, Uganda]

SIERRA LEONE Bohol, May 16, 1925, (E Hargreaves), one female, [B M N.H]

NIGERIA Olokemeji, Ibadan, one female, [So Afr Mus] 1914, (J. C Bridwell), one female, [U S N M]

FERNANDO PO 1901; (L Conradt), one female, [Paris Mus]

FRENCH EQUATORIAL AFRICA, GABOON one female, [Hebard Cln.].

BELGIAN CONGO. Bumbuli, Lake Léopold II District; January, 1914; (Dr J Maes), one female, [Mus Belg. Congo] Bambesa, Uele District;

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[48] Bihang till K Svenska Vet-Akad Handl, XXVIII, afd IV, no 10, p 24, (1902) [♀, Cameroons]

June 16, 1933, (J V Leroy), one female, [Mus Belg Congo] Stanleyville, October 6, 1928, (A Collart), one female, [Mus Belg Congo].

Uganda Kampala, July 20, 1917, one female, [B M N H] No exact locality, (R Dummer), one female, [So Afr Mus] Najunga, July 5, 1921, (C H Lankester), one male

These specimens have been compared with the original material There is considerable size variation in the female sex at least, but the available series is too small to venture a statement whether this is individual or geographic

The present records considerably extend the known range of the species, carrying it westward to Sierra Leone, and southward almost to the Kasai River in the Belgian Congo It thus is seen to cover in its distribution a large part of the West African Subregion

Panchlora stolata Borg

1902 *Panchlora stolata* Borg, Bihang till K Svenska Vet-Akad Handl, XXVIII, afd IV, no 10, p 23, taf I, fig 7 [♀, Cameroons]

Nigeria. Calabar, (A Good), March 15, 1921, two females, [Carneg Mus]

Fernando Po 1901, (L Conradt), one female, [Paris Mus]

Cameroons Efulen, October 11-November 8, 1922, (H L Weber), one male, one female, [Carneg Mus] Lolodorf, February 1925, May 1, 1924, (A I Good), two males, [Carneg Mus]

French Equatorial Africa, Gaboon Lambarene, 1911, (R Ellenberger), one male, [Paris Mus]

French Equatorial Africa, Middle Congo Nola, one male, [Paris Mus]

Belgian Congo Lumbi, Mayumbe, Lower Congo, June 9, 1925, (A Collart), one male, [Mus Belg Congo] Boma-Yanga, Lower Congo, October 14, 1912, (R Verschueren), one female, [Mus Belg Congo] Busira, Equator District, June 26, 1906, (Waelbroeck), one female, [Mus Belg Congo] Eala, Equator District, September, 1930, (D P Staner), one female, [Mus Belg Congo] Upper Lopori, Lulonga District, May to June, 1927, (J Ghesquière), one male, [Mus Belg Congo] Yambata, Bangala District, February-March, 1914, (De Giorgi), one female, [Mus Belg Congo] Likimi, Bangala District, December 1927, (A Collart), one male, [Mus Belg Congo] Stanleyville, 1925, (Edg. Chardon), one female, [Mus Belg. Congo] Dingila, Uele District, January to March, 1933, (J Urydagh), two males; [Mus Belg Congo] Niapu, Uele District, January, 1914, (Lang and Chapin), one female, [A M N H] Poko, Uele District, August, 1913, (Lang and Chapin), eight females; [A M N.H] Niangara, Uele District, November, 1910, (Lang and Chapin), two females, [A M.N H.] Medje, Kibali-Ituri District, April and May, September

20-24, 1910, (Lang and Chapin), two females, [A M N.H]. April, 1914, (Dr Christy) one female, [Mus Belg. Congo] Ipamu, Kasai District, August, 1922, (P Vanderijst), one female, [Mus Belg Congo]. Luebo, Kasai District, (D W Snyder), two females, [U S N M] Luluabourg, Kasai District, one female, [Geneva Mus] Kamiama, Lomani District, 1932, (R Massart), one male, one female, [Mus Belg Congo]

UGANDA PROTECTORATE Buamba Valley, July, 1921, (H Hargreaves); one female, [B M N H]

The above recorded series of this very sharply defined species shows the presence of considerable size variation, particularly in tegminal length This fluctuation is apparently individual, the eight Poko females alone exhibiting a noteworthy range, as is also the case with two females from Calabar The female from Fernando Po is small for that sex, but the insular locality may to a degree be responsible for this, yet the minimum-sized female from the adjacent mainland of Old Calabar is, in most dimensions, even smaller Again the male from the upper Lopori is the minimum seen for that sex, although other individuals from the adjoining districts of Equator and Bangala are of average size for the species The following measurements (in millimeters) of these and others listed, graphically present the size variability found

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen
♂, Lolodorf, Cameroons	12	3.2	4	12.5
♂, Lolodorf, Cameroons	11.5	3.6	4.4	14
♂, Upper Lopori, Lulonga Belgian Congo	10.4	3.1	3.86	11.9
♀, Fernando Po	15	3.78	5.87	14.7
♀, Calabar	13.8	4	4.7	14
♀, Calabar	15.5	4.4	5.6	17
♀, Poko Uele, Belgian Congo	16	4.5	5.5	15.8
♀, Poko, Uele, Belgian Congo	18	5	6	19.7
♀, Medje, Kibali-Ituri, Belgian Congo	18.3	4.4	6.5	21
♀, Medje, Kibali-Ituri Belgian Congo	16.3	5.3	6	20

The pronotal form of both sexes of *stolata* is quite distinctive[49] The interspace between the eyes varies very considerably in the female sex of *stolata*, ranging in the Belgian Congo series alone from subcontiguous (separated by 063 mm) to separated by a distinct interspace (in width 168 mm)

In *stolata* the distal section of the discoidal field of the tegmina usually has an appreciable sprinkling of black atomaceous punctulations, apart from and much smaller than the typical black spots shown by Borg in his figure. While the antennae are usually uniformly pale, they sometimes are in part considerably darkened In four individuals this infuscation extends from and includes article three to at least article nine, in another it is from article five, in eight from article eight, and in one it is from article ten While starting abruptly this infuscation generally is progressively weakened distad

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[49] For a discussion of the structural features of the pronotum of this species, see Rehn, Arkiv for Zoologi, 18A, no 18, p 17, (1926)

The range of *stolata* is now known to extend from Southern Nigeria (Calabar) across the Cameroons and the Belgian Congo to north of Lake Edward (Rehn, 1926) and Uganda (Buamba Valley), south to the Lower Congo, (Mayumbe and Boma-Yanga) and the Kasai (Luebo, Ipamu and Luluabourg) and the Lomami (Kaniama) On the island of Fernando Po it also occurs It thus has much the same distribution as *P stanleyana*, except that it is not known to range west of the Lower Guinea Forest District and the contiguous portions of the flanking Ubangi-Uele and Southern Congo Savanna Districts[50] While the future may show that *stolata* has a range equal to that of *stanleyana*, evidence of its presence in the Upper Guinea Forest and Savanna Districts is not at present available

PRONAUPHOETA Shelford

1909 *Pronauphoeta* Shelford, Deutsch Entom Zeitschr, 1909, p 620

Pronauphoeta viridula (Beauvois)

1805 *Blatta viridula* Beauvois, Ins Rec en Afriq et Amér, p 182, Orth pl 1b, fig 3 [Probably ♂, Kingdom of Oware [in present Nigeria]]

Belgian Congo Lisafa, Lulonga District, November, 1927, (Lt. Ghesquière), one male, [Mus Belg Congo]

I have already discussed the synonymy and relationship of this species,[51] and its relation to Gerstaecker's *adusta* and *vitellina* The present record is the first for the species from the northwestern Belgian Congo and connects the Ivory Coast, Gold Coast, Nigeria and Cameroons records discussed by me in 1933, with Giglio-Tos' record from Boko in the eastern Belgian Congo

The Lisafa male has been dried from alcohol and is completely decolored, as well as somewhat damaged, but comparison with Bingerville and Aburi individuals clearly establishes its identity

On Species of the Genus Nauphoeta

For the species of *Nauphoeta* we possess but a single serviceable key, that of Shelford published in 1908,[52] at which time he described six new species of the genus The developments of the last quarter century and the evidence of the series now before me, give to that work but a limited and relative usefulness, as in Shelford's mind there existed very decided uncertainty as to the limits of the genus, as well as those of the related genera

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[50] See Chapin, Bull Amer Mus Nat Hist, LXV, p 90, (1923), for the most modern map of the faunal areas of the Ethiopian Region

[51] Proc Acad Nat Sci Phila, LXXXIV, pp 458-459, (1933)

[52] Deutsch Entom Zeitschr, 1908, pp 127-128, (1908)

Leucophaea (= *Rhyparobia* of most authors) and *Panchlora* Definite defects were his failure to properly place Gerstaecker's *frenata*, which I have recently been able to do from Gerstaecker's type material,[53] his redescription of true *frenata* as a new species (*pulchra*), his confusion of *frenata* with *flexivitta* of Walker, and his failure to recognize *Panchlora brazzae* of Bolivar as a *Nauphoeta*, when it was based on the commonest and most widely spread of the truly West African members of the genus

In 1909 Shelford[54] erected the genus *Pronauphoeta*, giving it a position intermediate between *Nauphoeta* and *Panchlora* and placing in it certain species which I have recently discussed quite fully,[55] largely from the evidence of the type material In 1910, in attempting to draw a line between *Panchlora* and *Nauphoeta* Shelford[56] apparently overlooked his genus *Pronauphoeta*, and returned certain of the species, included in that genus when erected the previous year, to the genus *Nauphoeta* The features given by him as diagnostic of *Nauphoeta*, in contradistinction to those of *Panchlora*, are but in part of value, although the two are natural and quite different assemblages, with *Pronauphoeta* occupying a position between them, as stated by Shelford when describing it

I have seen no *Nauphoeta* material which would be referable to the species described by Kirby as *Rhyparobia pallescens*,[57] but this is in all probability a *Nauphoeta*, and may be the same as either *N testacea* Brunner or even *N invisa circumdata* here described Kirby's description, however, is so woefully superficial, stressing almost solely color features, it is impossible to speak with certainty on this point I have seen nothing having the "femora chocolate-colour or blackish, striped with yellowish white below", as described by him A critical examination of the type alone will determine whether these features have been unduly emphasized, and what the species' nearest relatives may be

The series now before me is probably the most representative lot of the genus *Nauphoeta* so far examined at any one time, and includes seventeen species and subspecies, of which seven are here described Under other circumstances I would endeavor to present a dichotomous key to all of the species of the genus, but as in addition to the possibility above mentioned, I have not seen material of at least three of those described as new by Shelford and other authors (i e *gestriana* Saussure, *minuta* Shelford and *bicolor* Shelford), I should have to resort to compilation, a most unsatisfactory and often misleading method of key construction Instead I shall limit myself to a few comments on the grouping of the species, from the evidence of those before me, add the geographic and variational information on the previously known species as drawn from the series, and describe the new forms which have been recognized.

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[53] Proc Acad Nat Sci Phila, LXXXIV, p 463, (1933)

[54] Deutsch Entom Zeitschr, 1909, p 620, (1909)

[55] Proc Acad Nat Sci Phila, LXXXIV, pp 455-463, (1933)

[56] Zool Jahrb, Suppl XI, heft 2, p 108

[57] Ann and Mag Nat Hist, (7) XII, p 377, (1903)

The forms of the genus which I have examined fall naturally into three major species groups,—the Frenata Group, which embraces those having the ventral surface of the tegminal mediastine vein supplied on the coastal side and in the marginal field with a series of strong, regular and spaced subpectinate rami, while the caudal femora have their ventro-caudal margin briefly but closely fimbriate, the Cinerea Group, with similar mediastine rami evident but much less marked, weaker, shorter and more irregular than in the Frenata Group, and no femoral fimbriation present, and the Testacea Group, in which the tegminal mediastine vein is without rami on the coastal side, while the caudal femora have at most but a few scattered fimbriae on the ventro-caudal margin.

The Frenata Group includes, in my conception of their linear arrangement, *N. epilamproides* Shelford, *mombuttu* new species, *frenata* Gerstaecker, *batesi* new species, *elegans* Shelford, *occidentalis* (Fabricius), *flexivitta* (Walker) and *procera* new species. The Cinerea Group contains only the widely distributed *cinerea* (Olivier), while the Testacea Group comprises *invisa* new species, *invisa circumdata* new subspecies, *silacea* new species, *testacea* Brunner, *sudanensis* Werner, *madecassa* and *heydeniana* Saussure and *idonea* new species.

All of the members of the Frenata Group are peculiar to the West African Subregion,[58] and chiefly limited to the two districts of the Guinean Forest Province of that subregion, while of those of the Testacea Group, *invisa, i. circumdata, silacea* and *testacea* are similarly restricted to the West African Subregion, *sudanensis* occurs in the Sudanese Savanna and the Somali Arid Districts of the East and South African Subregion, while *madecassa heydeniana* and *idonea* are Malagasy. Regarding the origin of the now circumtropical *cinerea*, it is difficult to speak with finality, but from the basis of distributional information available at this time, I feel its native home was East African as opposed to West African. This is in large part due to the paucity of information on its occurrence in West Africa, the complete lack of records of the species from most of the interior of Africa, and particularly that west of Uganda, and the rather numerous mainland East African records of its occurrence, these reaching from Egypt through the Sudan (here even in the huts of Shilluks) to eastern Tanganyika. The records from the Malagasy region, quite conceivably, may have been due to Arab vessels, which clearly furnished the medium for range extension of many adaptable insects before the day of the European in East African waters. The Portuguese may have been the means by which the species spread quite widely into the New World and the Orient, and from the latter subsequent movements into Polynesia and Australia logically followed In South America the sole mainland records are Brazilian, or from a land settled by Portuguese, although elsewhere in the New World the species has been noted only in Spanish settled lands, certain of which (i e Mazatlan, Mexico and the Galapagos) were clearly reached from the westward How much slave ships aided in the spread of *Nauphoeta cinerea* is less certain than in the case of *Oxyhaloa buprestoides*, which clearly owes its limited New World distribution (eastern Cuba) to the intermediary of slave ships[59]

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[58] Using the faunal areas of Africa as mapped by Chapin (Bull. Amer. Mus. Nat. Hist., LXV, p. 90, (1932).)

In connection with the present study I have examined 247 African specimens of the genus

Nauphoeta epilamproides Shelford

1908 *Nauphoeta epilamproides* Shelford Deutsch Entom Zeitschr, 1908, pp 123, 127, pl II, fig 7 [♂, ♀, Cameroons]

CAMEROONS Lolodorf, February 2 and March 3, 1924, (A I Good), two males, one immature male, [Carnegie Mus] Yaunde, May, 1923, one male, [Carnegie Mus]

BELGIAN CONGO Lukolela, Lake Leopold II District, January 26, 1931, (James P Chapin), one immature female, [A M N H]

While agreeing with the original description in all other respects, the above listed adult specimens have the coloration of the coxae and femora and the remainder of the limbs nearly uniform rufous, instead of the tibiae and tarsi being castaneous as described The blackish lineation of the anal vein, while always marked, is more decided in the distal two-fifths than in the more proximal portion

In size the two Lolodorf males alone show a surprising range, which, however, is matched in other species of the genus The dimensions of these specimens are as follows length of body, 42 and 50 mm, of pronotum, 10 8 and 12 3, greatest width of pronotum, 16 and 18, length of tegmen, 35 5 and 40 5, greatest width of tegmen, 15 5 and 16 5

The immature individuals are naturally referred with somewhat less certainty than the adults, but a check has been made of all available structural features which could prove of assistance in placing them specifically The limbs, as is the rule, are somewhat heavier than in adults, and the coloration is much darker than in the adults, being a nearly uniform blackish maroon, paling to prout's brown on the limbs and the medio-proximal portion of the abdomen The lateral sections of the distal margin of the ultimate evident tergite (supra-anal plate) are somewhat more sharply oblique subtruncate than in the adult males and round much more narrowly to the median emargination

These records are the first exact ones for the species, previously reported only from the Cameroons (without definite locality) and Spanish Guinea

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[59] See Rehn and Hebard, Bull Amer Mus Nat Hist, LIV, pp 290-291, (1927)

Nauphoeta mombuttu,[60] new species Plate 9, figs 31-33

A near relative of N *epilamproides* Shelford, agreeing in general form, the distinctive tegminal structure, width of eye interspace and basic color features, but differing in the bivittate pronotum, the more solidly pencilled proximal portion of the humeral trunk of the tegmina, the dark banded abdominal sternites, as well as the generally darker tone of the tegmina and the very clear and definite, but irregularly distributed, buffy aspersions, which occur over the whole of the tegmina

Type — ♀, Medje, Kibali-Ituri District, Belgian Congo July 17, 1910 (American Museum Congo Expedition, Lang and Chapin) [American Museum of Natural History]

Size very large (for the genus) form and surface as usual in *Nauphoeta* Head with width across eyes but faintly less than depth of same, in outline cordiform, interocular space equal to approximately one-fourth of width across eyes and three-fifths that between internal margins of the antennal scrobes, eyes little prominent, their outline but weakly marked off from the low arcuation of the occipital outline as seen in cephalic aspect, face subdepressed, palpi with ultimate article very faintly longer than penultimate one, former compressed, subsecuriform, latter infundibuliform antennae sub-equal to body in length.

Pronotum in general outline trapezoid-ovate, the point of greatest width at three-fifths the length, the latter equal to two-thirds the width latero-cephalic and cephalic sections of margin arcuate between the lateral angles of greatest width, a very weak sinuosity of the margin dorso-laterad of the head breaking off a more strongly arcuate supra-cephalic section, lateral angles well rounded obtuse, brief caudo-lateral sections of the margin sub-arcuately convergent caudad, passing broadly into the weakly obtuse-angulate caudal margin surface with disk subdeplanate, obliquely and broadly rounding ventrad into the cephalad convergent, declivent lateral areas

Tegmina surpassing the apex of the abdomen by a distance equal to half the pronotal length, broad elliptico-lanceolate, greatest width equal to two-fifths of the tegminal length, apex broadly rounded costal margin evenly arcuate from base to broad apex sutural margin sub-rect for a considerable part of its length, proximad briefly arcuate to the base and distad rather more broadly so to the tegminal apex marginal field very broad, at broadest point (proximal fifth of tegminal length) nearly equal to one-half of pronotal length, dorsal surface longitudinally shallow concave, passing evenly into the slightly broader scapular field, anal field semi-ovate, broad, greatest width contained twice in the greatest length of field, the latter dimension equalling two-fifths of total tegminal length· regular costad directed rami of the heavy mediastine vein stout, numbering thirteen,[61] oblique, spaced, some bifurcate, hardly at all elevated on dorsum of tegmen but developed as strongly marked and elevated ribs on ventral surface of same, costal rami of discoidal vein crossing scapular field regular in disposition, slightly more longitudinal and less robust than the rami of the mediastine vein, twelve to thirteen in number, as evident from dorsal surface passing into the regular micro-areolate pattern of most of the tegmina, on venter much less conspicuous and elevated than the strong mediastine rami, discoidal vein slightly sigmoid-sinuate, discoidal field with the sectors numerous and regular, slightly radiating, the intercalated false nervures generally three in number between each principal sector, connected by numerous, regular but not at all conspicuous cross-nervures, thus forming the very distinctive type of short-linear microareolation seen in this and numerous related species, anal veins arcuate, subangulate at its arcuation away from the humeral trunk and again briefly before it joins the sutural margin very slightly proximad of the basal third of the margin, axillary veins individually little evident in the general areolation of the anal field, which is similar to that of the discoidal. Wings equalling the tegmina in length.

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[60] After the Mombuttu people of the northeastern Belgian Congo

[61] In paratype eleven on each tegmen

Ultimate evident tergite (supra-anal plate) relatively broad, lateral margins arcuate with the median emargination broad acute, its bounding angles rounded obtuse, the incision not penetrating deeper than one-eighth of the length of the plate, surface appreciably depressed within its margins, the lateral borders particularly upcurved. Ultimate sternite (subgenital plate) transverse trigonal in outline as seen from the venter, its greatest median length approximately twice the proximal width of the sternite, lateral portions of margin oblique convergent, regularly so except for broad but very shallow infracercal flexures, caudal angle of margin broadly rounded obtuse, surface of tergite in section transversely arcuate.

Limbs moderately robust, femora all lacking spines on their ventral margins, tibiae with spines of extensor margins triseriately disposed. cephalic femora with ventro-cephalic margin having a regular series of fimbriae in distal half, median and caudal tibiae distinctively compressed, caudal tarsi with length of proximal article surpassing that of distal article by a distance equal to two-fifths of the same, pulvillus of proximal article extending proximad as a narrow strip very nearly to the ventral base of the article.

General base color of head, venter, abdomen, limbs and pronotum ranging from ochraceous-buff to dull zinc orange, on the limbs sometimes (in type) becoming russet, and occasionally (in paratype) as pale as light ochraceous-buff on the head, base color of tegmina shading from clay color (type) or cinnamon-buff (paratype) proximad to cinnamon-brown (type) or bister (paratype). Head with a dark pattern, ranging from russet (paratype) to prouts brown (type), consisting of a broad interocular bar, with (paratype) or without (type) three fine lines continued upon the occiput, a narrower inter-antennal bar, ventrad of which the face may be lightly (paratype) or heavily (type) suffused with russet, palpi largely russet, paling proximad, eyes dresden brown mottled with bister, antennae mars brown. Pronotum with a pair of broad, convergent, lateral, intermarginal bars of blackish fuscous, these meeting the caudal but narrowly failing to reach the cephalic margin, distinctly failing to meet cephalad (paratype) or there subconfluent (type). Tegmina with the humeral trunk distinctly pencilled with mummy brown, this narrowing distad and ceasing briefly proximad of the middle of the tegmen, anal vein completely but very delicately pencilled with the same, virtually the entire tegmina sprinkled with irregularly-sized, but always relatively small ochraceous-buff speckles, these almost absent from the anal field of the type but as conspicuous there as elsewhere in the paratype, normally covered portion of dextral tegmen prouts' brown but with the usual ochraceous-buff speckles Wings prouts' brown Abdomen with the individual sternites broadly bordered caudad with deep fuscous, the ultimate sternite (subgenital plate) not margined but with a discal clouding of the same shade, cerci fuscous, ultimate evident tergite (supra-anal plate) with proximal half fuscous, the margin may (type) or may not (paratype) be narrowly bordered with the same, a pair of fine, closely-placed medio-longitudinal dark lines crossing the pale portion of the tergite Tibial spines, much of the adjacent portion of the tibiae and tarsi very deep chestnut brown

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
Medje, *type*	46	11 5	17	42 5	17 5
Faradje *paratype*	46 8	12	17	43	18 8

In addition to the type I have before me a paratypic male taken at Faradje, Uele District, Belgian Congo, January, 1913, by the American Museum Congo Expedition (Lang and Chapin), and now in the collection of the Academy The few noteworthy features of difference from the type have been brought out in the above description

Nauphoeta frenata Gerstaecker

1883 *Nauph[oeta] frenata* Gerstaecker, Mitth Naturw Ver Neu-Vorpomm und Rugen, Greifswald, XIV, p 67 [♀, Limbareni (= Lambarene), Ogowe River, Gaboon]

1906 *Nauphoeta pulchra* Shelford, Deutsch Ent Zeitschr 1906, pp 126, 127 [♀, between Lambarene and the sea Lower Ogowe, Gaboon]

1933 *Nauphoeta frenata* Rehn, Proc Acad Nat Sci Phila LXXXIV, p 463 [Notes from Gerstaecker's type, and establishment of synonymy]

BELGIAN CONGO Djamba,[62] Uele District, December 1924, (G F de Witte), one female, [Mus Belg Congo]

The present specimen is referred to *frenata* although it is much paler and less strongly marked than Gerstaecker's type, the Lambarene topotype, both of which I have already examined, or Shelford's type of *pulchra*

The antennae are uniformly pale, there is no dark interocular bar, the tarsi are pale and the tibial spines brownish, while, the pronotal dark bars are greatly reduced in length and emphasis, not meeting cephalic or touching either the cephalic or caudal margins These bars are so reduced in the Djamba individual they are merely well-pencilled, obliquely divergent subsigmoid, relatively narrow lines, their greatest diagonal length not exceeding one-half the medium length of the pronotum The caudal margin of the pronotum is, however, distinctly pencilled with blackish between the points at which the lateral bars usually join this margin, while the distal palpal article shows no infuscation The pencilling of the humeral trunk is quite distinct and reaches to the middle of the tegmen, as described by Gerstaecker, while that of the anal vein is similarly evident

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[62] Djamba is on the Rubi River about twenty-one miles in an air-line down-stream from Buta Approximate position, 24° 40′ E, 2° 52′ N

Although Borg has recorded *frenata* from the Cameroons and Shelford credits it to Spanish Guinea, the latter author had previously confused *frenata* with *flexivitta,* and one or both of these records may refer to the latter species The present specimen definitely extends the range of *frenata* very materially to the eastward, and points to a broad area of specific distribution within, at least, the Lower Guinea Forest Subprovince

Nauphoeta batesi, [68] new species Plate 9, figs 34 and 35

A near relative of both *frenata* Gerstaecker and *elegans* Shelford, agreeing with both in the lateral dark bars of the pronotum and the blackish pencilling of the humeral trunk and the anal vein of the tegmina From *frenata* it is slightly more divergent than from *elegans,* having a more attenuate and not as stocky a form, and differing specifically in the larger size, more deplanate, more transverse and less vaulted pronotum, which also has the lateral angles less rounded, the dark lateral bars on the pronotum broader and less sharply outlined, not joined cephalad, and the caudal margin of disk without a blackish pencilling, the interspace between the eyes narrower, the tegmina more elongate, and the limbs slightly more slender From *elegans,* to which it is probably more nearly related, the present species can be separated by the smaller size, the proportionately larger pronotum, the distinctly broader, proportionately shorter and distad more broadly rounded tegmina, which also have the costal margin evenly arcuate, and not sinuate as in *elegans,* in the blackish pencilling of the humeral trunk reaching distad of the apex of the anal vein and to at least the middle of the tegmen (as is also found in *frenata*), in the lateral sections of the distal margin of the ultimate tergite of the female being oblique convergent to the median incision (as in *frenata*) instead of regularly arcuate as in *elegans*

In general appearance *batesi* stands directly between *frenata* and *elegans,* being less stocky and more deplanate than the former, with an identical tegminal pattern, and shorter, broader and less attenuate and " panchlorine " than the latter

Type —♀, Bitje, Ja River, Cameroons (G L Bates) [Academy of Natural Sciences of Philadelphia, Type no 5540]

Size medium, general form, as seen from dorsum, elongate elliptical

Head in outline as seen in cephalic aspect broad cordiform, the greatest width across eyes subequal to depth of head, face subdeplanate mesad least interocular width, which is ventrad of the occipital line, contained three and seven-tenth times in the greatest width across the eyes and but slightly more than one-half the width between the internal margins of the antennal scrobes, occipital line slightly more strongly arcuate than the even curvature of the eye outline as seen in cephalic aspect palpi with ultimate article very faintly longer than the penultimate article, subsecuriform, penultimate article rather broadly infundibuliform

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[68] Dedicated to Mr George L Bates, in recognition of his studies on the zoology and zoogeography of West Africa

Pronotum in outline ovate-trapezoidal, greatest median length contained about one and half times in greatest width of same, the latter at two-thirds of the pronotal length cephalad of the lateral angles the marginal outline of the pronotum is broadly and evenly arcuate, lateral angles rather narrowly rounded, brief latero-caudal sections of the margin shallowly arcuate and passing by a very weakly indicated juncture into the very broadly and shallowly obtuse-angulate caudal margin surface of disk relatively deplanate, laterad roundly oblique declivent, this cephalad weakly embracing the sides of the head

Tegmina ellіptico-lanceolate, greatest width, which is at middle of length, equal to slightly less than two-fifths of the tegminal length costal margin arcuate, more strongly so proximad and distad than in median three-fifths of margin, apex broadly rounded, sutural margin nearly straight, very faintly arcuate, more distinctly so proximad and distad, broadly passing into the apex marginal field relatively broad, its width equal to one-third of the pronotal length, surface oblique, very shallowly concave longitudinally; scapular field at broadest point slightly wider than marginal field, anal field semiovate, broad, greatest width contained two and one-fourth times in greatest length of same area mediastine vein with its regular oblique rami little evident from dorsum, but well elevated and conspicuous on ventral surface, ten to twelve in number, several bifurcate, rami of discoidal vein crossing scapular field few and little evident in the general micro-areolation of the area, more longitudinal than the rami of the marginal field, not at all conspicuous on the ventral surface, discoidal vein slightly sigmoid, discoidal field with the sectors at least sixteen in number, slightly radiating, the general areolation very dense and of the type discussed under *N mombuttu*, anal vein, as in *mombuttu* but the angulate emphasis less definite, joining the sutural margin at its proximal third, axillary veins no more conspicuous than discoidal sectors, eleven evident micro-areolation as in discoidal field Wings equalling the tegmina in length

Ultimate evident tergite (supra-anal plate) subtrapezoidal, with the lateral sections of the margin slightly caudad convergent, passing by very broadly rounded caudo-lateral angles into two distal, strongly convergent, almost transverse suberect sections separated a median rectangulate emargination ultimate sternite relatively deplanate, broad lateral sections of the margin shallowly sinuate convergent and rounding to a narrow median truncate apex, cerci tapering, apices rather slender, briefly surpassing ultimate tergite

Limbs slender for the genus femora with ventro-cephalic margin of cephalic and ventro-caudal margin of caudal pair closely fimbriate and ventro-caudal margin of median pair with a few scattered hairs, other margins without vesture, all unspined, median and caudal tibiae distinctly compressed, caudal tarsi with proximal article surpassing length of distal article by a distance equal to one-fourth the length of the former, pulvillus of proximal article extended proximad as a narrow strip

Base color of head, pronotum and tegmina ochraceous-buff, darkening to clay color on the limbs and abdomen, the coxae (particularly caudal) washed proximad with dresden brown, the abdominal sternites transversely bordered distad with the same, the limbs approaching ochraceous-tawny, tibial spines russet, tipped with fuscous. Head broadly barred transversely between the eyes with prout's brown, a much narrower, less definite or complete band of the same between the antennal bases as well as three transversely disposed spots on the lower face, palpi becoming prout's brown distad, antennae russet to mars brown except for the two proximal articles which are largely pale, eyes blackish fuscous. Pronotum with a conspicuous pair of broad, caudad diverging almost solid bars of cinnamon-brown to mummy brown, which laterad border the disk, and extend from near the cephalic margin, which they narrowly fail to reach, to the caudal margin, which they broadly join immediately dorsad of the tegminal bases, the caudal margin between the bars narrowly pencilled on the cingulum of the same with the dark color of the bars, disk between the bars as well as the areas laterad of the same virtually immaculate. Tegmina with proximal half of humeral trunk and anal vein finely but sharply pencilled with fuscous, occasionally (paratype) the base color of the tegmina is finely nebulose with a darker wash, approaching pale dresden brown.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♀, Bitje, *type*	34.6	8.6	12.8	31.5	12
♀, Ganda Sundi, *paratype*	35	9.2	13.4	33	13.2

In addition to the type I have before me a female, considered paratypic, from Ganda Sundi, Mayumbe, Lower Congo District, Belgian Congo, taken by de Briey, and from the collection of the Museum of the Belgian Congo. This individual shows no features of noteworthy difference from the type except the few mentioned above in the color description and that of size indicated in the above measurements. The specimen is slightly less sharply contrasted in coloration, due to the pale base of the tegmina being less uniform and more nebulose than in the type, but a similar range of tone is seen in a number of the species of the genus.

Apparently *batesi* ranges from near the mouth of the Congo northward to the Southern Cameroons, while its eastward limit is unknown.

Nauphoeta elegans Shelford

1908. *Nauphoeta elegans* Shelford, Deutsch. Entom. Zeitschr., 1908, pp. 124, 127. [♂, Cameroons.]

CAMEROONS: Lolodorf, May 28, 1927, September, 1925 and 1926, (A. I. Good), two males, three females, [Carn. Mus.]. Batanga, March, 1914, (F. H. Hope), one female (lacks alar organs), [Carn. Mus.].

BELGIAN CONGO: Ukaika (Forest),[64] December, 1910, (Grauer), one female, [Mus. Belg. Congo].

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[64] Ukaika is apparently a very small village within the forest at its eastern edge, fifty kilometers west of the old post of Beni on the Semliki River (see Sassi, Annalen K.-K. Naturh.-Hofmus. Wien, XXVI, p. 347, (1912).) It does not appear on any map I have seen, and I am indebted to my friend Dr. James P. Chapin, for calling my attention to Sassi's indication of its position in his report on Dr. Grauer's bird collections.

This species is a much more slender and elongate type than these which have already been discussed, in its general form bearing more resemblance to *testacea*, which, however, belongs to another group of the genus.

The internally notched character of the pronotal bars, mentioned by Shelford, is found in all five individuals, while the blackish pencilling of the humeral trunk of the tegmina always stops at a point which is no more distad than the juncture of the anal vein with the sutural margin. The shape of the tegmina suggests *Leucophaea* or *Pronauphoeta*, but the characteristic herring-bone like costad ramification of the tegminal mediastine vein, found in the species of this group of the genus, is very regularly and strongly developed.

Marked individual size variation occurs in the species, as the following measurements (in millimeters) show.

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, Lolodorf	40	9.5	14.5	42	13.2
♀, Lolodorf	42.5	9.2	13	42.5	11.9
♀, Lolodorf	44	10	14.7	47	15
♀, Ukaika	38.5	9.2	13.7	42	—[65]

The only previous record, except that of the type, is of its occurrence in Spanish Guinea (Shelford). The Ukaika individual is fully typical and carries the range of the species across the West African Forest Province to its eastern border.

Nauphoeta flexivitta (Walker). Plate 10, figs. 44 and 45.

1868. *Periplaneta flexivitta* Walker, Catal. Blatt. Brit. Mus., p. 133. [♂, Congo.]
1890. *Panchlora brazzae* Bolivar, Anal. Soc. Españ. Hist. Nat., XIX, p. 303. [♀, Region of the Congo.]
1899. *Nauphoeta discoidalis* Saussure, Abhandl. Senckenb. Naturf. Gesell., XXI, p. 582. [♀, Boma Suna [=Sunda], (Belgian Congo).]

FERNANDO PO: 1901, (L. Conradt), two females, [Hebard Cln.].

CAMEROONS: Batanga, March and April, 1914, (F. H. Hope), two males, one female, [Carn. Mus.]. Lolodorf, March 29, 1920, (A. I. Good), one female, [Carn. Mus.]. Metet,[66] May 31, Aug. 19, 1919, Nov. 6, 1918, (A. I. Good), one male, two females, [Carn. Mus.]. Ebolowa, (H. C. Wing), one male. Bitje, Ja River, April and May, 1909 (rainy season), June and July, 1909 (dry season), (G. L. Bates), eight males, twelve females, three immature males, three immature females.

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[65] Tegmina curled so that exact width cannot be accurately measured.

[66] Dr. Kahl of the Carnegie Museum, has been kind enough to inform me that this locality, which I had been unable to locate on charts, is a large mission station two hundred miles east of Kribi, and a number of miles east of Sangelima (=Fulasi). This position would be in the general neighborhood of the Upper Ja River, on which Bitje is situated.

FRENCH EQUATORIAL AFRICA (GABOON) Lambarene, Ogowe River; 1911-1913, (R Ellenberger), two males, one female, [Paris Mus] No exact locality, one female, [Geneva Mus]

FRENCH EQUATORIAL AFRICA (MIDDLE CONGO) Brazzaville, 1909, (G Benard), one male, [Paris Mus]. Vicinity of Brazzaville, 1907, (E Roubaud & A Weiss), one immature female, [Paris Mus] Region of the Upper Ivindo, tributary of Ogowe River, 1906, (Dr J Cavot and Capt. Cottes), one female, [Paris Mus]

BELGIAN CONGO Moanda, Lower Congo, August 26, 1920, (Dr H Schouteden), one female, [Mus Belg Congo] Malela, Lower Congo; July 5 and 8, 1915, (Lang and Chapin), two females, [A M N H] Ganda Sundi, Mayumbe, Lower Congo, September 23 and 25, 1920, (Dr H Schouteden), one male, one female (De Briey), one male, [Mus Belg Congo] Kisantu, Lower Congo, (R P Van Wing), one male, one female, one immature female, [Mus Belg Congo] Mangembo, Lower Congo, 1931, (Dr Zwolakowski), one female, [Mus Belg Congo] Lukolela, left bank of Congo River, Lake Leopold II District, Jan 21, 1931, (J P. Chapin), one immature male, [A M N.H] Moma, Equator District, 1928, (Molin), one female, [Mus Belg Congo]. Boende, Equator District, March 4, 1926, (A P Hulstaert), one male, [Mus Belg Congo] Yacoma, Ubangi District, one male, [Mus Belg Congo] Yambata, Bangala District, February-March, 1914, (DeGiorgi), three males, one immature female, [Mus Belg Congo] Sokoloko, Bangale District, 1929, (Mme Babelou), one female, [Mus Belg Congo] Barumbu, Aruwimi District, August, 1925, (Lt J Ghesquière), two males, [Mus Belg Congo] Panga, Aruwimi District, 1926, (Eug Bock), one female, [Mus Belg Congo] Bambesa, Uele District, September 16, 1932 and March 9, 1933, (J Vrydagh), two females, [Mus Belg Congo] Dungu, Uele District, 1912, (M Hutereau), one female (DeGreeff), one female, [Mus Belg Congo] Ekibondo's Village, between Niangara and Dungu, Uele District, September 27-October 3, 1934, (Vanderbilt African Exped of 1934, J A G Rehn), nine males, nine females, two immature females Faradje, Uele District, January, 1913, March-April, 1911, November 1912, (Lang and Chapin), three males, two females, [A M N H] June, 1919, (Blommaert), one male, one female, [Mus Belg Congo] Dingila, Uele District, June 20, 1933, (H J Bredo), one female, [Mus Belg Congo] Stanleyville; August 1909, (Lang and Chapin), one male, [A M N H] Bafwaboli, Stanleyville District, September 12, 1909, (Lang and Chapin), two males, four females, [A M N H]. Medje, Kibale-Ituri District, April 1, 1914; (Dr Christy), one male, [Mus Belg Congo] Leverville, Kwango District, 1928, (Mme J Tinant), one male, [Mus Belg Congo]. Idiofa, Kasai District, 1923, (Lobart), one immature male; [Mus Belg Congo].

Ilebo, Kasai District, (A Eherny), one female, [Mus Belg Congo] Luebo, (D W Snyder); one male, three females, 12 immature individuals of both sexes, [U S N M] Luluabourg, (P Callewaert), two males, one female, [Mus Belg Congo] two females, [Geneva Mus] Kapanga, Lulua District, November, 1932, (G F Overlaet), one female, [Mus Belg Congo] Kabinda, Lomami District, (Dr Schwetz), one female, [Mus. Belg Congo] Kisala, Tanganyika-Moero District, October 14, 1920, (Dr H Schouteden), two females, [Mus Belg Congo] Elizabethville, Katanga, July 13, one female "Region of the Lakes", (Dr Sagona), one female, [Mus Belg Congo] Kissenyi, Ruanda District, April 2, 1924, (Van Saceghem), one male, one female, [Mus Belg Congo] Lake Bulero, Ruanda District, September 1927, (J Leonard), one female, [Mus Belg Congo] Ruhengeri, Ruanda District, August, 1933, one male, [Mus Belg Congo]

ANGOLA N'Dalla Tando, Dec 29, 1908, one female

The synonymy given above has been established only after a very carefully study of the literature, supplemented by a comparison by Dr Uvarov of material of the species as here understood, with the types of Walker's *flexivitta* As to the general warrant of the synonymy I would refer the interested student to the extent of the material on which the conclusions have been based, and the comments made below on the variability of the species

Dr Uvarov's notes on the original material of *flexivitta* are, in part, as follows "The types are two females, very similar in all details, collected by Andrew Curror, R N Surgeon and presented to B[ritish] M[useum] by Dr Richardson in 1843 They are labelled simply 'Congo' and no further details are available as to locality, but it appears probable from the collector's profession that they were taken on the coast of West Africa" [very probably the Congo estuary or the nearby kingdom of Congo in northern Angola] "Pronotal pattern consists of two well-defined sublateral dark stripes as in your more narrowly marked specimens, the stripes join anteriorly Proportions of palpal joints are 10(?) 23 21 24 Proportions of posterior tarsal joints (measured along upper edge as seen in lateral view) 47 10 10 5 32, (last joint not including pulvillus or claws) Sculpture of elytral subcostal veins on ventral side—no appreciable difference from your specimens Abdominal pattern very light brownish, similar to that in your specimens"

Dr Uvarov has also called attention to the fact that the eyes in the types are more broadly separated than in the specimens of the same sex sent for comparison, but this feature shows some individual variation in the rather ample representation before me Similarly he notes, and shows in several sketches, some difference in the outlines of the ultimate tergite and the ultimate sternite These apparent variations can be met in the series of the species before me, containing as it does material preserved in different ways The chitin of these parts almost invariably contracts and twists in specimens dried from alcohol, thus producing different outlines from those seen in individuals normally dried without immersion

There is a fair amount of individual size variation in each sex, caused chiefly by fluctuations in the tegminal length This is evident in females from a single locality, such as those from Fernando Po, Metet, Bitje, Bafwaboli, Ekibondo's Village, Dungu and Faradje, but especially in the case of the last-mentioned place, where the extremes show **27** and **30 5** mm as the tegminal length in individuals of approximately the same body bulk

The most noteworthy size variation seen, however, is geographically correlated This is the uniformly small size of the specimens from the Lake Kivu and Ruanda District, those from Lake Bulero, Ruhengeri, and Kissenyi, Ruanda and the "Region of the Lakes" being far smaller than the others of that sex listed above

The female labelled "Region of the Lakes" and that from Lake Bulero, Ruanda have body lengths of but **25** and **27** millimeters respectively, while the same dimension of the tegmen similarly shows **18** and **20** The Kissenyi female is slightly larger than that from Lake Bulero, but is still far smaller than the average female from the greater portion of the species' distribution The Ruhengeri male is, however, by all odds the smallest individual of the species which I have seen, the body measuring but **20** millimeters in length and the tegmen 15 6, as against **29 5** and **25** respectively for an average-sized male from Ekibondo's Village This quite depauperate type of the species also has in both sexes a distinctly broader interocular area, while its general form is as a whole less attenuate, broader and the alar organs may or may not quite reach to the base of the ultimate tergite The broader interocular area is clearly but a correlated part of the general broadening of the form in these individuals from the Ruanda area

I feel this depauperation, with its correlated structural differences, is merely an expression of peripheral attenuation, the species in this area having reached the most eastern point from which it is known, and a district in which its preferred forest habitat is greatly restricted and progressively giving way to a grassland environment We do not know *flexivitta* from localities lacking at least fair areas of forest of the West African type, and, as with other forms of similar propensities, the restriction of this habitat as found in Ruanda could clearly be the cause of this depauperation At this time I do not feel we have a geographic subspecies worthy of nominal recognition, as our evidence is still too scanty and points more to depauperation than progressive evolution

The feature chiefly responsible for the synonymy given above is the extent to which the pattern of the pronotum varies This ranges from one extreme in which the lateral, cephalad converging, dark bars are sharply and definitely outlined, generally but not invariably connected cephalad, and with the inclosed pale disk unmarked, the yellowish borders laterad of the dark bars also clear and unmarked This extreme, which is not common, is found in the Moanda, Malela, Ganda Sundi, Barumbu, Leverville, Boende and Dingila representation, and closely approached by several from Ekibondo's Village By the progressive development of a dark arabesque or sublyriform pattern in the pale disk, and by the increasing emphasis of a sublongitudinal dark line in the yellowish lateral borders, the bilineate type of pattern becomes less definite, until in the intensive extreme the whole pronotal disk is dark fuscous with a much restricted symmetrical pale pattern of commas and dots, while the pale lateral areas are almost completely bisected longitudinally by a dark fuscous bar The intensive extreme of the present series is a female from Ganda Sandi, from which locality we have one of the most typical recessive individuals (a male) A female from Lolodorf and that labelled " Gaboon " very closely approach the Ganda Sundi extreme The face pattern remains essentially the same through the whole series, the dark areas merely being a shade darker in the more intensive individuals The greater part of the individuals before me represent conditions connecting the two extremes, and a series like that from Bitje has virtually all the intermediate steps in the passage from one to the other

Except for the references given above in the synonymy the literature is almost barren of information on the distribution of this West African Forest Province type The single record not there included is one of its occurrence in " East Africa ", given by Shelford[67] on the basis of a specimen so labelled included with material taken by the Mecklenburg expedition This is doubtless one of the Grauer specimens which were labelled in that fashion, and many of which were included in the same series of other orthopterous families These specimens beyond question did not come from East Africa in the proper use of the name, but instead from some portion of the region of the Great Lakes From the material now in hand it is evident *flexivitta* ranges from the Cameroons, and the related island of Fernando Po, eastward, to at least the extreme upper Uele basin, and the Lake Kivu region of Ruanda south to the lower reaches of the main Congo, the Kasai and into Katanga at least as far as Elisabethville It also occurs in northern Angola and probably enters Uganda, but definitely seems to be absent from the Upper Guinea district, there being replaced by *guineensis* and *testacea*

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[67] Wissen, Ergebn Deutsch Zent -Afr -Exp 1907-1908, III, Zool I, p 503, (1912)

Nauphoeta occidentalis (Fabricius)

1793 [*Blatta*] *occidentalis* Fabricius, Entom Syst, II, p 7 ["Americae Insulis" (probably Island of San Thomé, West Africa) [68]]
1872 *Nauphoeta guineensis* Saussure, Mém Soc Phys Hist Nat Geneve, XXIII, p 133, pl X, fig 47 [♀, Guinea]
1903 *Rhyparobia rufipes* Kirby, Ann and Mag Nat Hist, (7) XII, p 377 [♀, Sierra Leone]

French Guinea Nzo, 1910, (A Chevalier), one immature female, [Paris Mus]

Liberia Mount Coffee, March, 1895, one male, [U S N M]

Ivory Coast Vicinity of Dimbokro, 1911, (Capt Posth), one immature female, [Paris Mus]

Gold Coast Aburi, 1912-1913, (W H Patterson), one female, [Brit Mus Nat Hist]

Dahomey (Middle) Plateau of Zaguanado, "season of tempests and tornadoes", 1910, (P Ducorps), one immature male, [Paris Mus]

The synonymy of *rufipes* under *occidentalis* was established by Shelford in 1908 (vide infra) from an examination of Fabricius' type, and that of *guineensis* has been made evident by the specimens now before me Fabricius' *occidentalis* was said by him to have the pronotum "atro, margine omni pallido punctisque duobus baseos fulvis," while *rufipes,* according to Kirby, has the "pronotum black, with a narrow pale yellow border running all round" Saussure's *guineensis* was described and figured as having a dark, completely pale bordered pronotum with a pale lyrate pattern on the disk It is evident from both Fabricius' and Kirby's descriptions they refer to entities with the pronotal disk black, completely circled marginally with yellow, the black disk in one said to have in addition two pale fuscous basal puncta Shelford's synonymy indicates that in his opinion this exists as variation within the species, and that the pronotum, aside from the margin, may be solidly black or provided with fulvous puncta

The present material, even though quite limited, fully supports Shelford's conclusions, and demonstrates to my satisfaction that the pale pronotal pattern may, in the opposite (recessive) extreme from that described by Kirby as *rufipes,* develop the complicated fulvous lyrate pattern of the disk which has been well figured by Saussure when describing *guineensis* The specific identity of these color types seems unquestioned, particularly as other features of color pattern, which in numerous species are more fundamental and less responsive to variational tendencies, such as the face pattern and that of the venter of the abdomen, are the same in both types

The occiput, aside from narrow pale juxta-ocular margins, and the greater portion of the face ventrad to the clypeal suture always solidly mummy brown to fuscous, is separated by a transverse inter-ocellar bar of antimony yellow to clay-color, while the dark comma-like dashes present laterad in most of the abdominal sternites, each in a semi-elliptical area of antimony yellow to ochraceous-buff, are very definite specific features, found in both of the adults now before me, and stressed by both Saussure and Kirby The pale juxta-ocular lateral borders to the dark occiput are hardly indicated in the intensive Mount Coffee male, but very distinct in the female from Aburi

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[68] See discussion by Shelford (Trans Entom Soc London, 1907, p 468, (1908)), and Rehn and Hebard (Bull Amer Mus Nat Hist, LIV, p 255, (1927)), as to the labelling of the type and identity of the island from which it was secured

The Aburi individual is very similar to that on which Saussure founded *guineensis*, having a complicated lyrate pale pronotal pattern The Mount Coffee male is in the extreme intensive condition, similar to the type of *rufipes*

Of the immature individuals two are in the instar preceding maturity, while that from Nzo is in the next younger one The color pattern of the immature condition very closely resembles that of the same stage of *N flexivitta*, i e largely blackish fuscous, bordered with orange-ochraceous to zinc orange or golden yellow In immatures of *occidentalis* the cephalic and caudal pale marginings of the pronotum are broader, particularly latero-caudad, while the head is basically blackish fuscous without more or less evident indications of a pale inter-ocellar cross band, as in *flexivitta*

On the basis of available information the distribution of *occidentalis* is known to extend from Sierra Leone (type of *rufipes*) and Liberia eastward to the Gold Coast (Aburi, reported by Gerstaecker in 1883 and Rehn in 1933), and very probably the island of San Thome, (type of *occidentalis*) The species seems to be limited almost entirely to the Upper Guinea Forest Subprovince, and there replace and be complementary to *N flexivitta* of the Lower Guinea Forest Subprovince

Nauphoeta procera, new species Plate 9, figs 36 and 37

A near relative of *N flexivitta*, but superficially much suggesting a very long winged individual of *N cinerea*, from which, however, the strongly developed marginal rami of the mediastine vein of the tegmina will at once separate it

From *flexivitta* the present species can at once be distinguished by the more elongate, narrower form, the broader interocular space, the proportionately smaller pronotum, which has a pattern suggesting *cinerea*, the proportionately more elongate and narrower tegmina, which in both sexes appreciably surpass the apex of the abdomen, by the fewer (six to seven) regularly spaced rami of the mediastine vein of the tegmina, and the proximally less robust cerci

Type —♀, Obuasi, Gold Coast March, 1916. (Dr Rafferty) [Academy of Natural Science of Philadelphia, Type no 5545]

Size medium (for genus), form relatively elongate and slender, tegmina and wings ample, in repose both appreciably surpassing apex of abdomen; texture of tegmina subcoriaceous

Head broad cordiform, greatest width across eyes subequal to depth of head, face distinctly deplanate, rather narrowly but evenly rounding dorsad to inter-ocular region and laterad to subtumid infra-antennal areas, occipital width between eyes equal to three-fifths that between internal margins of antennal scrobes, in cephalic view the occipital arcuation is seen to be distinct from and not continuous with the broadly arcuate eye outline, the eyes hardly at all prominent palpi with ultimate article equal in length to one and two-fifth times that of penultimate, in profile the former is elongate subreniform, the penultimate moderately infundibuliform, the antepenultimate article quite stout, straight except for a short proximal arcuation, its length subequal to that of ultimate antennae but little shorter than body.

Pronotum of the usual *Nauphoeta* type, in outline subtrapezoidal, greatest width, which is at three-fifths the length, equal to faintly more than one and one-half times the length, cephalic margin truncato-arcuate, nearly as broad as head, rounding laterad into the slightly arcuate, strongly oblique divergent lateral margins which extend to the rather marked but obtuse lateral angles, these passing into short, sharply caudad converging and nearly straight caudo-lateral margins, these evenly blending into the broad, transverse, very weakly mesad produced caudal margin in transverse section the disk is distinctly and broadly deplanate, declivent lateral areas proportionately narrow, cephalad more sharply deflexed and closely fitting about the sides of the head

Tegmina in repose surpassing apex of abdomen by a distance equal to slightly less than half the pronotal length, in shape elongate lanceolate, greatest width, which is at three-fifths of length, faintly greater than one-third of the tegminal length costal margin lightly arcuate in proximal third, thence distad almost imperceptibly sigmoid to the distal fifth, from which point it broadly rounds into the semi-ovate apex, sutural margin nearly straight for most of its length, proximad briefly arcuate and distad passing by a broader arcuation than the costal to the apex marginal field of moderate width, the latter contained two and one-half times in that of anal field, the broadest portion of the scapular field slightly wider, anal field in outline semi-ovate rather than subpyriform prominent oblique rami of the mediastine vein six to seven in number, regularly spaced, those distad more longitudinal than the more proximal ones, evident but not elevated on dorsal surface, distinctly ribbed and elevated on ventral surface, scapular field crossed by eight to eleven sublongitudinal rami, major rami and intercalated nervures of the discoidal field but slightly different in emphasis, three intercalated nervures between each true ramus, all closely connected by a large number of cross-nervures, producing a multitude of areolae, usually rectangulate distad but much smaller and more cribroso-areolate proximad, anal vein regular in its arcuation; areolation of anal field similar to that of proximal third of discoidal field but all longitudinal venational elements stouter and less clearly separable into axillary veins and intercalated nervures, apparently ten being axillary veins Wings in repose reaching to tegminal apex

Ultimate tergite (supra-anal plate) with production broadly arcuate, mesad its margin being rather broadly and shallowly obtuse-angulate emarginate, dorsal surface of tergite subconcave, free margin, as a whole very briefly setulose ultimate sternite (subgenital plate) quite broad, its median length less than a third the proximal width, margin arcuate but slightly on each side ventrad of the cerci, its median fourth very weakly produced and shallowly emarginate on median line, the margin there very slightly deflexed but in no way compressed cerci surpassing ultimate tergite, regularly tapering, exposed proximal width equal to one-third of exposed length, subdepressed, apex slender, moderately setose

Femora with ventral margins unspined, caudal pair with ventro-caudal regularly and closely setulose, ventro-cephalic of cephalic femora in distal two-thirds similarly but more delicately supplied, the median femora on ventro-caudal margin with a very few spaced setae cephalic femora relatively stout, distinctly compressed, dorsal and ventral margins equally arcuate, caudal femora, while larger proportionately, less robust than median, ventral margin, straighter than the moderately arcuate dorsal one caudal tarsi with proximal article one and one-half times as long as distal

Allotype —♀, Mount Coffee, Liberia May, 1894 [United States National Museum]

The following features are solely those of noteworthy difference from the above description of the female sex (type)

Head with interocular width between eyes broader, equal to seven-tenths that between internal margins of antennal scrobes, in cephalic view the occipital outline is less distinctly separated from that of eyes

Pronotum as in male, but cephalic margin is more definitely low arcuate and the caudal margin is slightly more produced and as a whole very broadly and roundly obtuse-angulate

Tegmina in repose surpassing apex of abdomen by a distance nearly equal to the pronotal length

Ultimate tergite (supra-anal plate) with greatest proximal width slightly greater than twice median length, general outline, form and marginal condition as in female but dorsal surface with a definite but low medio-longitudinal carination ultimate sternite (subgenital plate) small, greatest exposed median length equal to slightly more than half of greatest proximal width, stylar sinuses not large but distinctly and subsymmetrically incut mesad, the distal margin broadly arcuate between the divergent but briefly acute and subspinose angles which limit the sinuses, surface adjacent to the latter briefly impressed meso-caudad, this condition progressively evanescent toward the middle line, styles styliform, apically acute, relatively long, cerci as in female

General base color ochraceous-buff, areally as pale as light ochraceous-buff, the head and pronotum marked with mummy brown, the tegmina in large part washed with saccardo's umber, this mottled in a nebulose fashion by areas of the pale base color; occasionally (Mount Coffee paratype) this suffusing wash has a mouse gray tone Head rarely (Olokomeji paratype) with base color as dark as dull zinc orange, always with a broad dark interocular bar, face with a transverse and medio-longitudinal pattern of bars roughly resembling the letter Y with the arms more depressed, this maculation ranging in strength and completeness from one with the transverse arms very heavily and broadly marked, to an opposite extreme in which but two faint spots in the position of these arms are the sole survivors of the maculation (type and Mt Coffee paratype). eyes mars brown to bister, antennae russet to prout's brown, slightly paler at base. Pronotum with a sublyrate discal cloud pattern of russet which strongly suggests the similarly situated pattern seen in *N. cinerea*, the exact outline of this area fluctuating somewhat, but it is always limited to the caudal three-fifths of the disk, broader caudad than cephalad, not reaching the caudal margin, divided more or less completely in caudal half and enclosing a pair of circular dots; lateral borders of disk sharply marked by a pair of mummy brown, caudad strongly diverging, weakly undulate bars, which originate caudad of the eyes, free from the cephalic margin and extend virtually to the caudo-lateral margins, the caudal margin between these bars not at all distinctly infuscate. Tegmina with the mottling described above involving all of their surface except the marginal and most of the scapular fields, which are quite solidly pale, pale clouding of discoidal field often due to a marked pencilling of longitudinal rami and cross-nervures with the pale color, dark pencilling of humeral trunk fine, less definite in the Olokemeji paratype than in the others, reaching little, if at all, distad of the line of the apex of the anal field, anal vein with similar pencilling and also less definite in the Olokemeji individual. Wings with venation pencilled in buckthorn brown, anterior field appreciably infumate with the same. Abdomen with both surfaces washed more or less definitely with dresden brown, ultimate sternite in both sexes washed in part with cinnamon-brown, cercal apices similar. Tibial spines tawny, russet tipped.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♀, Obuasi, Gold Coast, *type*	26.3	6	9.2	23.5	8.2
♀, Mt. Coffee, Liberia *paratype*	26.2	6.6	10.4	28.1	9.5
♀, Olokomeji, Nigeria *paratype*	29.4	6.7	9.4	28.6	8.8
♂, Mt. Coffee Liberia, *allotype*	25	6.6	9.2	24	—[60]

In addition to the type and allotype I have before me a female taken at Mount Coffee, Liberia, April 1897, by R. P. Currie, of the United States National Museum, and one of the same sex taken at Olokemeji, Ibadan, Nigeria, 1914, by J. C. Bridwell, and in the collection of the Academy.

These specimens show some variation in size, which is evidenced in the above table of measurements, and also in certain details of the coloration, which have similarly been discussed. None of these differences, however, is of sufficient weight to cause any difficulty in the recognition of this very distinctive species, which superficially much resembles a larger, long-winged replica of *cinerea*. As pointed out above numerous important differences will be found to distinguish the species.

Apparently *procera* is a species of the Upper Guinea region ranging from Liberia to western Nigeria, and probably, from the localities, found in a variety of environments.

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[60] Dried from alcohol and the tegmina are too strongly curled to measure their width accurately.

Nauphoeta cinerea (Olivier)

1789 *Blatta cinerea* Olivier, Encycl Méthod, Ins, IV, p 314 ["Ile de France" (= Mauritius)]

ANGLO-EGYPTIAN SUDAN Singa, Sennaar District, 1907, (Ch Alluaud); one male, [Paris Mus]

UGANDA Entebbe, elev 3800 feet, (C R S Pitman), November 14, 1928, one male, [Hebard Cln]

ZANZIBAR (C Cooke), one male, [Mus Comp Zool]

TANGANYIKA TERRITORY West Kilimanjaro, 1914, one male, [So Afr Mus] Morogoro, June 15, (A Loveridge), one female, [Mus Comp Zool] Duthumi, November 14, (A Loveridge), one male, one female, [Mus Comp Zool] Lindi, one male "German East Africa", one female

TRANSVAAL Barberton, January 13, 1924, three females, [Albany Mus]

NATAL Durban, one female, [So Afr Mus]

MAURITIUS (Desjardins), one male, one female, [Paris Mus]

While *cinerea* is a species of virtually circumtropical distribution, it is quite spotty in its occurrence, at least as far as available information is concerned, and there are but few records in the literature of its occurrence in West Africa

Under the generic discussion I have already stated my impression that *N cinerea* is of East African origin, and also stressed the scarcity of records of its occurrence in Central Africa, particularly that portion west of Uganda Shelford has recorded the species from Bibundi in the Cameroons, but this may have been a commercial introduction by way of the West Coast At all events the information on the occurrence of the species in West and Central Africa points toward its penetration along the major water or land trade routes

Shelford's *N minuta*,[70] while compared by him with *cinerea*, is a very different species, of far smaller size, relatively short tegmina and distinctive color features

Nauphoeta invisa, *new species* *Plate 10, fig 38*

A short, stocky species, belonging to the group of the genus including *testacea* Brunner, *sudanensis* Werner, and *silacea*, here described, all of which in common lack the pectinate series of rami on the costal side of the tegminal mediastine vein

The species breaks into two geographic races, one of which is limited to the strictly forest Lower Guinea Subprovince of the West African Forest Province, while the other occurs in the Upper Guinea Subprovince of the same, and peripherally about the area of distribution of the typical form, into which it intergrades

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[70] Deutsch Entom Zeitschr, 1908, pp 124, 127, (1908), [♀, Cameroons]

From its nearest relative, testacea, the present species in both its races, can at once be separated by the more stocky, proportionately broader form, with the alar organs but little, if at all, surpassing the abdominal apex, the pronotum proportionately smaller, the tegmina elongate elliptical rather than lanceolate, their marginal field very appreciably broader and their anal field less elongate, while the limbs are somewhat shorter and stouter

From its subspecies *circumdata* typical *invisa* differs in both sexes in the more compact form and shorter tegmina, which latter do not markedly surpass the abdomen, in the apex of the tegmina being evenly rounded and in no way subangulate, in the tegminal anal vein being more broadly arcuate and the anal field in consequence less pyriform elongate than in *circumdata*, and in the tegminal humeral trunk being much less extensively (proximal two-fifths only), as well as less distinctly and broadly, lineate with fuscous The two races are connected by intermediates which are discussed under *N i circumdata*

Type —♂, Bitje, Ja River, Cameroons April-June, 1910 (G L Bates) [Academy of Natural Sciences of Philadelphia, Type no 5543]

Size medium (for genus), form stout, relatively broad, tegmina and wings but little surpassing apex of abdomen, surface of abdomen minutely etched with punctulations and vermiculate impressed lineations, pronotum subglabrous to the eye, but with a rather open pattern of very minute, wrinkled, impressed and irregular lineations, evident only under magnification and then quite shallowly engraved, tegmina with the same coriaceous surface texture found in most of the species of the genus

Head as seen in dorsal aspect evident cephalad of pronotum for its full width, although projecting but narrowly, seen in cephalic aspect slightly broader than deep (as 12 to 11), face roundly subdeplanate, occipital line in same view regularly and quite distinctly arcuate, the eye outlines slightly more strongly so, the curvature of the respective areas in consequence not quite continuous, least interspace between eyes, i e immediately dorsad of ocellar spots, very broad, but slightly less than that between internal margins of antennal scrobes (as 6 to 6 5) palpi stout, ultimate article distinctly securiform, its dorsal line nearly straight oblique, its length one and one-half times that of the penultimate, latter crassately infundibuliform, its length but slightly less than that of the relatively deep antepenultimate article (as 1 66 to 2), which latter has its dorsal line arcuate in proximal fourth, thence distad straight oblique to apex

Pronotum stout, transverse subelliptical, greatest length equal to one and one-fourth times the greatest width of the head (as 15 to 12), the greatest width of pronotum contained nearly one and one-half times in length of same, lateral angles obtuse but distinctly marked and not at all broadly rounded, cephalic margin broadly arcuate, its degree of curvature very similar to that of occipital line, passing laterad with almost no indication of angles into the diverging weakly arcuate lateral portions of the margin, these separated by the very definite and but slightly blunted lateral angles from the broadly arcuate caudal margin, which is not at all definitely divided into caudo-lateral and true caudal sections; surface of pronotum in transverse section vaulted, the lateral portions more arcuate than the disk

Tegmina but narrowly surpassing the apex of the abdomen, this being by no more than one-third of pronotal length, general form of tegmen broad lanceolate, the greatest width, which is mesad, contained slightly less than two and one-half times in the tegminal length costal margin arcuate throughout, more strongly so proximad and distad than in the median section, apex evenly rounded, sutural margin with axillary section faintly arcuate, thence to distal third virtually straight, distal third broadly arcuate to apex marginal field very broad at widest point, but faintly less than half the width of anal field (as 4 to 9), the poorly defined extremity of the field not quite as far distad as the apex of anal field, scapular field slightly broader than marginal field, occupying faintly more than one-third of the total tegminal width (as 6 8 to 19), anal field hardly at all pyriform, the greatest width equal to one-half the greatest length of the same marginal field with surface *impresso-cribrose,* a venational pattern merely indicated by the intervening lands, costal veins of the scapular area numerous and closely tied to the intercalated venation, the whole producing a densely anastomosing, slightly radiating sculpture of the dorsal surface, ventral surface without elevation or unusual emphasis of the costal veins, discoidal field with the seventeen or so regular sectors sublongitudinal, faintly oblique, the intercalated nervures varying from one to three, in the latter case sometimes irregular in trend, cross-nervures numerous and producing definite, very numerous and minute areolets, anal vein as a whole arcuate, more strongly so in proximal third and distal fifth than between, joining sutural margin at two-sevenths of its length from the base, axillary veins at least eighteen in number, closely placed, largely subparallel Wings in repose reaching to tegminal apices

Ultimate tergite (supra-anal plate) with its produced portion trapezoidal in general outline, the lateral margins oblique caudad convergent, passing by narrowly rounded angles into the shallowly emarginate and subbilobate distal margin, the emargination of this whole margin very shallow and obtuse mesad ultimate sternite (subgenital plate) slightly narrower than the inter-cercal width of the ultimate tergite, its distal margin strongly arcuate between the usual diverging, short and uncinate processes, styles quite small, simple, nearly straight cerci short, not surpassing distal margin of ultimate tergite, stout, tapering, internal margin straight, external largely arcuate to apex, the arcuate portion weakly compressed carinate, cercus as a whole distinctly depressed, apices relatively acute

Limbs robust, distinctly compressed, ventral margins of all femora unspined except for a distal one present on all the margins except the ventro-cephalic of the cephalic femora and the ventro-caudal of the caudal femora, pile fringe of ventro-cephalic margin of cephalic femora even and regular but very fine in texture All tarsi robust, caudal pair with proximal article somewhat longer than distal one (as 3 5 to 2 5), its pulvillus extending virtually to base of article

Allotype —♀, same date as type but without date of capture [Academy of Natural Sciences of Philadelphia]

The following features are solely those noteworthy of difference from ones given in the description of the male (type)

Head with occipital outline, as seen in cephalic aspect, regularly arcuate with the curvature of the eye outline, proportions of interspace between eyes as in male

Pronotum as in male except that the lateral angles are slightly less pronounced.

Tegmina not surpassing apex of abdomen, leaving the extremity of the ultimate tergite exposed, general outline of tegmen faintly more elongate and lanceolate than in male, but difference in proportions from that sex very slight.

Ultimate tergite (supra-anal plate) with its general shape as in male, the emargination and bilobation of the distal margin being of the same character; ultimate sternite (subgenital plate) broad, with median portion of distal margin arcuately produced, laterad of this, infra-cercally, the margin is quite shallowly concavo-emarginate, this very gradually passing into the straight oblique more lateral sections extending to the lateral bases of the sternite, apex of sternite falling slightly short of apex of ultimate tergite, cerci slightly more slender than in male, external margin with a definite straight section proximad of the arcuate portion.

General color of dorsal surface uniform ochraceous-buff,[71] tending somewhat toward ochraceous-tawny on pronotum, the tegmina occasionally with cloudings of tawny-olive as an undertone, humeral trunk lined for approximately the proximal fourth of tegmen with blackish fuscous, the distal two-fifths of this with the pencilling narrowly attenuate, while the more proximal section is slightly broader and more uniform in width, a more or less definite and relatively broad band of ochraceous-orange borders the dark pencilling on the costal side, covering much of the adjacent portion of the marginal field, yet not sharply defined and reaching distad only to the divergence of the mediastine vein, normally covered portion of right tegmen hair brown. Head uniformly of the general color, eyes hair brown to prout's brown, antennae ferruginous to hazel. Abdomen ventrad tawny to chestnut-brown, occasionally paling laterad to ochraceous-buff, (so in type), dorsal surface nearer buckthorn brown, cerci on dorsum of color of dorsum of abdomen, on venter washed to a variable degree, and usually on internal side, with fuscous, apex pale. Limbs with coxae of the general pale color, remainder of limbs solidly english red to morocco red, the spines of the same color proximad passing to blackish fuscous distad.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, Bitje, Cameroons, *type*	33.4	9	13.2	26.7	11.1
♀, Bitje, Cameroons, *allotype*	40	9.6	14.1	30	12.6
♀, Batanga, Cameroons, *paratype*	40	11	16	33	14.7
♀, Avakubi, Belgian Congo, *paratype*	37	10.9	15	30	13.5

The above measurements given an index to the size range seen in the female sex, the only one represented by a series. There is almost no size difference noticeable in individuals of that sex from the same localities.

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[71] Poorly preserved specimens are much darker and very dull, almost dresden brown in tone. It is evident that this is entirely due to poor preparation and subsequent dessication.

In addition to the type and allotype, I have before me two females taken at the type locality by Bates (one labelled "June 1909, dry season") and in the collection of the Academy, a female taken at Batanga, Cameroons, April, 1914, by F H Hope, and from the Carnegie Museum, one female from Boende, Equator District, Belgian Congo, taken in November, 1925, by P Brumage, and from the Museum of the Belgian Congo, a female from Basoko, Aruwimi District, Belgian Congo, taken June 21, 1909, by Lang and Chapin and from the American Museum of Natural History, a female from Avakubi, Kibali-Ituri District, Belgian Congo, taken December 5, 1909, by Lang and Chapin, also from that institution, three females from Medje, Kibali-Ituri District, Belgian Congo, two taken in April, 1914 by Dr Christy and from the Museum of the Belgian Congo, and one taken August 9, 1910 by Lang and Chapin from the American Museum of Natural History, and a male and a female from Dingila, Uele District, Belgian Congo, one (♂) taken October 3, 1932, by J Drydagh, the other (♀) taken June 20, 1933, by H J Brédo, and from the Museum of the Belgian Congo All of these specimens I am considering paratypes

These individuals show no color variation not discussed above and size has already been considered The ratio of length of tegmina and wings to the abdominal apex shows a little variation, but this means very little, as the degree to which the abdomen has been retracted is necessarily important in this respect One Bitje paratypic female has the apices of the alar organs reaching exactly to the apex of the ultimate tergite The other paratypes all show some, although but little, extension of the tegmina and wings caudad of the abdomen, but this is exceedingly slight in the Batanga specimen The evidence points toward very slightly longer alar organs in the representatives of the species from the northeastern Belgian Congo, as would be expected from what we know concerning the distribution of *N invisa circumdata*, here described

Nauphoeta invisa circumdata, new subspecies Plate 10 fig 39

Above under typical *invisa* I have presented the differential features of this geographic race, which occupies an area surrounding that inhabited by the typical (nominate) form of the species extending westward across the Upper Guinea Subprovince as far as Sierra Leone Typically *circumdata* is before me from Liberia, Sierra Leone, and Uganda and Katanga, Belgian Congo, but individuals discussed below from the upper Uele, Lake Tanganyika and the Kasai are virtually intermediate between the two subspecies Apparently the two intergrade in the area where is found the transition from true forest to the surrounding grass and bush savanna condition In the Belgian Congo, at least, this seems to be the explanation

Type —♀, Royesville, Liberia May 27, 1920 (O W Barrett.) [Hebard Collection, type no 1285]

The following description is largely comparative with that of the female sex of the preceding typical (or nominate) form of *invisa*, and stresses solely those characters showing sufficient difference to be noted.

Form more elongate, tegmina more elongate and slender.

Tegmina briefly surpassing apex of abdomen,[72] more elongate lanceolate, greatest median width contained approximately one and two-fifth times in tegminal length; costal margin less regularly arcuate distad, there the curvature being less and a tendency to be oblique subarcuate more definite, apex definitely narrowed and rounded obtuse-angulate, sutural margin with arcuation to apex in distad third more gradually and less strongly curved; marginal field proportionately slightly narrower, being slightly less than half as broad as anal field (as 6 to 13), and more definitely evident distad, reaching in that direction as far as the apex of the anal field; scapular field actually broader than same sex of *i. invisa* and occupying distinctly more than one-third of total tegminal width; anal field very slightly longer than in *i. invisa*, thus having more of a subpyriform outline than in the typical subspecies; discoidal field with the differentiation of the sectors and the intercalated nervures very difficult, much more so than in *i. invisa*, anal vein with its curvature mesad slightly flatter, joining sutural margin more nearly at the proximal third than in *i. invisa*, differentiation of the auxillary veins and intercalated nervures of the anal field less evident than in *i. invisa*.

Coloration as in *N. i. invisa*,[73] the head, pronotum and tegmina identical except that the humeral trunk is more decidedly and more extensively lineate with blackish fuscous, reaching distad to slightly beyond the proximal third of the tegmen, the marking also being slightly broader and more conspicuous than in *i. invisa*. The limbs in the Sierra Leone individual have the femora madder brown, infuscate proximad and distad, the coxal extremities and the entire trochanters, tibiae and tarsi as well as spines, entirely blackish fuscous. In the Royesville type the limbs are uniform, between mahogany red and burnt sienna, the femora and tibiae narrowly margined distad with blackish fuscous, the tibial spines nearly uniformly of the same, which also clouds much of the tarsi. The Uganda specimens are similar in limb coloration to the material of *N. i. invisa*, but the uniformity even extends to the tibial spines which show almost no infuscation at all.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♀, Royesville, Liberia, *type*	42.5	11.3	15.7	36.2	13.9
♀, Sierra Leone, *paratype*	42[74]	10	13.5	32.4	13.3
♀, Kampala, Uganda	34.6	10.5	14.9	30	12.2
♀, Damba Island, Lake Victoria	39.2	10.5	14.6	30.7	12.9
♀, Ibawa River, Katanga, Belg. Congo, *paratype*	44.8	10.4	14.5	32.5	12.9

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[72] The abdomen has been extended somewhat in the type and the difference is less than would have been true in life. This is evidenced by the tegminal proportions.

[73] The Sierra Leone paratype has been greatly discolored, and probably stained, in killing or drying, so its coloration, in part at least, has not been considered as representative or natural.

[74] Abdomen abnormally extended.

In addition to the type I have before me the following material, certain of the adults of which I consider paratypic

Sierra Leone, 1906, (E Roullet), one female (paratype), [Paris Museum]

Mt Coffee, Liberia, February and April (immature only), 1897, (R P. Currie), one female (paratype), one immature male, one immature female, [U S N M]

Kampala, Uganda, (A Baudet), one female

Damba Island, Lake Victoria, 30 miles E of Entebbe, Uganda, elev 3700 feet, Nov 11, 1928, (C R S Pitman), one female, [Hebard Cln]

Ibawa River, Katanga, Belgian Congo, December 17, 1925, (F G Overlaet), one female (paratype), [Mus Belg Congo]

The Sierra Leone, Liberia and Katanga specimens are fully typical of the subspecies, except that the latter has the pencilling of the tegminal humeral trunk more delicate and not as broad as in those from more western Africa, the Kampala and Damba Island individuals, however, have the tegmina and wings slightly shorter than in the others In the Kampala specimen the tegminal apex, the shape of the anal field and the emphasis and extent of the humeral trunk pencilling are as typical for *i circumdata*, while the Damba Island representative shows approach to *i invisa* in the slightly shorter anal field of the tegmina, although the tegminal apices are the typical acute condition of the present race In the latter specimen the pencilling of the humeral trunk is of the extensive type characteristic of *i circumdata*

Four other specimens before me are virtually intermediate between *N i invisa* and *N i circumdata*, these being one male each from Niangara, taken December, 1910 by Lang and Chapin, [A M N H] and Faradje, taken January, 1913 by Lang and Chapin, [A M N H], Uele District, Belgian Congo, one female from Albertville, west shore of Lake Tankanyika, Belgian Congo, taken December, 1918 by R Mayne, [Mus Belg Congo], one female from Luluabourg, Kasai District, Belgian Congo, taken by P Callewaert, [Mus Belg Congo], two females from Kapanga, Lulua District, Belgian Congo, taken October, 1934, by G F Overlaet, [Mus Belg Congo] In the shape of the anal field of the tegmina and the emphasis and extent of the humeral pencilling they hold an intermediate position between the two subspecies

Nauphoeta silacea, *new species* Plate 10, figs *40-42*

A most interesting and distinctive species, related on one hand to *N invisa*, described above, and on the other to *N testacea* Brunner, but differing from both in the distinctly smaller size, the less expanded head, the more strongly transverse pronotum, which also have a distinctive surface contour involving paired impressed arcuate lines, the less expanded and less distinctly fossorial cephalic tibiae, the dull, instead of moderately shining, surface of the pronotum and tegmina, the straighter sutural margin of the tegmina and the more rufous tone to the ochraceous of the general coloration, as well as the reduction of the black pencilling of the humeral trunk to a very brief proximal touch From *invisa* it also differs in the less robust character of all the limbs, and the trigonal instead of symmetrically trapezoidal ultimate tergite (supra-anal plate) of the male From *testacea* the present species can, in addition to the features given above, be separated by the less elongate form, the slightly broader marginal field of the tegmina, and also the broader tegmina as a whole The general ensemble of this species is quite different from any other of the genus which I have seen and its true relationships are evident only after considerable comparison It is in no way related to *N cinerea* or Shelford's *N minuta*, which would promptly be suggested by the small size of the present species

Type — ♂, M'Bamou, west of Brazzaville, Middle Congo, French Equatorial Africa 1903 (Montezer) [Paris Museum]

Size small (for genus), form markedly depressed, in general elliptical as seen from dorsum, surface of pronotum and tegmina in general dull, seen at certain angles apparently with a definite " bloom," at others dully polished, ventral surface as a whole dully polished

Head, as seen from dorsum, visible cephalad of pronotum for virtually its entire width, in cephalic aspect broad subcordiform, greatest breadth across eyes subequal to depth of head, occipital outline low arcuate, continuous with the eye outlines, which latter, however, are more strongly arcuate laterad, least inter-ocular space very broad, equal to seven-eighths that between internal margins of antennal scrobes, face mesad roundly subdeplanate, passing evenly into the subtumid infra-antennal portions eyes in lateral view reniform regularly narrowing ventrad palpi moderately slender, ultimate article straighter and less definitely securiform than in related species, its depth equal to two-sevenths of its length, the latter equal to one and seven-twentieth times the length of the penultimate article, which is approximately but not regularly infundibuliform, antepenultimate article subequal in length to ultimate, subcompressed, nearly straight, ventral margin straight, dorsal the same except for a brief proximal arcuation antennae damaged and incomplete

Pronotum in general shape roughly transverse elliptical, with lateral angles marked but obtuse, greatest length contained one and one-half times in greatest width of same cephalic margin of supra-cephalic hood markedly arcuate and passing laterad without appreciable intervening angulation into the similarly but less strongly arcuate, caudad divergent lateral parts of the cephalic margin, lateral angles marked but rounded obtuse, caudo-lateral sections of margin relatively short, in direction distinctly oblique convergent, arcuato-subtruncate, passing broadly, without an angle, into the subtransverse caudal margin which is made very weakly bisinuate by the low and but slightly produced median lobule, lateral and caudo-lateral margins rather coarsely cingulate, medio-cephalic margin non-cingulate, caudal section very finely and continuously rimmed· surface of pronotum with disk subdeplanate in caudal two-thirds, lateral areas broadly oblique declivent, supra-cephalic section of disk hooded rather closely about occipital base, transversely subimpressed caudad to a point between paired, impressed arcuate chiefly transverse subsulciform lines placed at the latero-cephalic boundaries of the pronotal disk

Tegmina surpassing apex of abdomen by a distance equal to seven-tenths of the pronotal length, general shape lanceolate, the greatest width, which is mesad, contained two and two-third times in the greatest tegminal length costal margin as a whole markedly arcuate with some little oblique flattening in distal third, passing rather abruptly to the broadly rounded rectangulate apex, which is joined by a brief but strong arcuation in the distal fourth of the sutural margin to the nearly straight remainder of the latter marginal field relatively broad, its greatest width equal to half that of anal field, distad the marginal field does not reach quite as far as apex of anal field, scapular field with its width slightly greater than that of marginal field and slightly less than half that of the discoidal field (as 4 5 to 10), anal field moderately elongate, elliptico-subpyriform, its greatest length equal to twice its width surface of marginal field cribrosely impresso-punctulate, no venation indicated on either surface, costal veins of scapular field distinct, rather regularly disposed, somewhat more longitudinal and less oblique arcuate than usual, approximately fourteen in number, the more distal ones anastomosing to a degree proximad, in but slight relief on ventral surface, humeral trunk relatively straight distad of the not at all pronounced arcuation of the proximal fifth, discoidal sectors sublongitudinal, distinct, a single intercalated nervure between each, cross-veins very numerous, particularly toward the humeral trunk, distinctly oblique, due to their number the areolets as a whole are transverse or subquadrate, not at all longitudinal, sectors sixteen in number, anal vein arcuate, somewhat flattened mesad, reaching sutural margin at two-fifths of its length from the base, axillary veins thirteen in number, the intercalated nervures virtually as decided and the whole venation of the anal field relatively dense, the areolets little more than cribrosely impressed puncta Wings in repose reaching to the tegminal apices, their apices agreeing in contour with those of the tegmina

Ultimate tergite (supra-anal plate) with the margin of its median produced section arcuately trigonal, sub-bilobate mesad by a relatively deep and narrow incision of the margin, laterad of which the separated sections are rather narrowly rounded although not at all produced caudad of the arcuate regularity of the general margin ultimate sternite (subgenital plate) of the type usual in this sex of the genus but not entirely symmetrical, the medio-distal section of the margin, as seen from venter, distinctly arcuate dextrad to the usual marginal unguiculate hook, while sinistrad it is straighter toward the corresponding one on that side, the embraced section of the immediate margin distinctly but narrowly cingulate, with approximately the distal fourth of the sternite in the inter-stylar area quite sharply, but not at all angularly, flexed dorsad, its surface near each of the processes subexcavate, the latter relatively short and stout, distinctly unguiculate, styles as seen from venter moderately arcuate, in length each equal to approximately two-fifths the distance between their base, tapering, apices very narrowly rounded, ventral surface concavely excavate (in dry type). cerci moderately elongate, even lacking their immediate apices surpassing the apex of the ultimate tergite by about half the cercal length, tapering, greatest width probably not more than one-fourth of the full cercal length, internal margin virtually straight, external weakly arcuate in proximal half, nearly straight convergent distad, weakly but appreciably longitudinally cingulato-carinate on external margin

All femora moderately slender (for the genus), the median and caudal quite uniform in depth except for a brief narrowing distad, margins as in other species of the genus but pile fringe of ventro-cephalic margin of cephalic femora very short cephalic tibiae slightly over two-thirds as long as cephalic femora, on internal face its distal half is uniform in width and subequal to one-fourth of the tibial length, these tibiae distinctly less fossorial in development than in the species' relatives, median and caudal tibiae appreciably compressed and (particularly the caudal) in large part with flexor and extensor margins subparallel caudal tarsi with length of proximal article at least equal to that of the three succeeding articles, pulvillus of its ventral surface reaching almost to the base of the article.

General color of dorsal surface clay color, quite appreciably washed with zinc orange on the pronotal disk, ventral surface and limbs between ochraceous-buff and cinnamon-buff Head almost uniform cinnamon-buff, antennal scrobes in greater part pencilled with mummy brown, proximal antennal article (all remaining) of head color, palpi slightly paler, of the general ventral color, eyes cinnamon-brown to mummy brown Pronotum unmarked except for a microscopic atomaceous sprinkling of tawny on the disk, and a paler bordering of the cephalic, lateral and latero-caudal margins Tegmina uniform except for the exceedingly brief infuscation of the humeral trunk, this being mummy brown and in definite length less than half the width of the marginal field, distad the infuscation is not sharply defined but blends into the general tone Tibial spines of the general limb colors, distad prout's brown

Length of body, 22 mm, length of pronotum, 5 9, greatest width of pronotum, 9, length of tegmen, 20, greatest width of tegmen, 7 5

The type of this most distinctive species is unique

Nauphoeta testacea Brunner

1865 *N[auphoeta] testacea* Brunner, Nouv Syst Blatt, p 284 [♀, Island of S Thomé, West Coast of Africa (Gulf of Guinea)]

LIBERIA Monrovia, March, 1895, one male, [U S N M] Mount Coffee; February, 1894, one male, [U S N M]

IVORY COAST Vicinity of Dimbokru, 1910, (Capt Posth), two females, [Paris Mus] Between Sanru and Kuale, Land of the Toura, upper Sassandra, 1910, (A Chevalier), one female, [Paris Mus] Assinie, 1882, (Chaper), one female, [Paris Mus].

DAHOMEY no exact locality, 1916, (Grisel), one female, [Geneva Mus]. Plateau of Zaguanado, ["Zagnanado"] Middle Dahomey "season of tempests and tornadoes", 1910, (P Ducorps), four females, [Paris Mus] Forest region of Hollis, Adja-Ouere, Illemon, Plateau of Zaguanado ["Zagnanado"] and Ketou, 1910, (P Ducorps), two females, [Paris Mus]

FRENCH EQUATORIAL AFRICA, UBANGI-SHARI Krébédké (Fort Sibut), southern Dar Banda, 1904, (Mission Chari-Tchad, Dr J. Decourse), one female, [Paris Mus]

The above material shows no noteworthy difference from Brunner's original description of *testacea,* which can at once be separated from *invisa* and its subspecies *circumdata* by the more elongate, slender form, lanceolate tegmina, and markedly narrower marginal field of the same In addition comparison shows a number of other, less readily evident differential features

The species is somewhat variable in size individually, but not sufficient to cause any difficulty in its recognition

The distribution of *testacea* is seen to extend from Liberia and the Ivory Coast eastward across Dahomey to at least the Ubangi-Shari territory at Fort Sibut The latter locality is a typically gallery forest one (personal acquaintance in 1934), and probably the species is less an inhabitant of the extensive Guinea forest districts than it is of those in which the Guinean grassland and riverine forest alternate The conditions under which it occurs on the island of São Thome, (San Thomé) are not known

Nauphoeta sudanensis Werner

1907 *Nauphoeta sudanensis* Werner, Sitzungsb K-k Akad Wissensch Wien, Math-Nat Kl, CXVI Heft II, Abt 1, p 176 [♂, ♀, Tewfikia and Mongalla, Anglo-Egyptian Sudan]

GALLALAND. Sheikh Husein, October 1 and 6, 1894, (A Donaldson Smith), one male, two females[76]

These specimens fully agree with all the details of Werner's description of *sudanensis,* except that he states the ultimate sternite (subgenital plate) of the male is truncate, while in the male in hand it has the margin quite regularly arcuate between the laterad directed horn-like points found on this sternite Possibly the medio-distal section of the margin in the original male of *sudanensis* has been bent dorsad, in which case the true shape would be masked and the distal margin of the plate appear truncate

From the present record the range of the species is seen to extend eastward from the White Nile to the southern portion of Abyssinia (Gallaland)

Nauphoeta madecassa Saussure

1891 *N[auphoeta] madecassa* Saussure, Societas Entomologica, VI, p 17 [♂, ♀, Madagascar]

MADAGASCAR Tananarive, 1892, (Grandidier), one male, [Paris Mus] 1914, (Waterlot), one female, [Paris Mus] one female, [Hebard Cln ex Geneva Mus] Region of Ambositra, 1907, (J Descoupentries), one female, [Paris Mus]. Analamazotra, Great Eastern Forest, October 20 and November 1930, (Olsoufieff), two males, six females, [Hebard Cln] Ampefy, Prov Itasy, Central Plateau, February and March, 1930, (Olsoufieff), one male, one female, one immature male; [Hebard Cln] Andrahomana, South Madegascar, November, 1901, (Ch Alluaud), one male; [Hebard Cln ex Paris Mus] Region of Sakarami, 1905, (Maurice de Rothschild), one female, [Paris Mus] No exact locality, two males, six females, one immature female, [A N S P and Hebard Cln]

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[76] These are the specimens recorded by me in 1901 as *N gestriana* Saussure See Proc Acad Nat Sci Phila, 1901, p 276, (1901).

This series shows there a very marked amount of individual size variation in both sexes, the extremes (in millimeters) being as follows

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen
♂, Tananarive	22	5.8	8	14.3
♂, Madagascar '	24.2	6.7	9	16.8
♀, " Madagascar "	24.2	6.3	8.2	16.8
♀, ' Madagascar "	33	8	10.5	23

The species is known only from Madagascar

Nauphoeta heydeniana Saussure

1891 *Nauphoeta heydeniana* Saussure, Societas Entomologica, VI, p 17 [♀, Madagascar]

MADAGASCAR Great Oriental Forest near Tananarive, one female, [Carnegie Mus]

This species, subsequent to the original publication, was described at greater length and figured by Saussure and Zehntner[76]

In the later discussion there is described a more uniformly pale type of the species which lacks the brownish escutcheon on the pronotal disk found in the typical form, and in consequence in it the whole pronotum is grayish fawn in color In the typical form the pale lateral areas of the pronotum are distinctly contrasted with the brown picturate disk, producing a general appearance quite different from that of the uniformly colored phase

The specimen above recorded represents the type with the uniformly pale pronotum, lacking all trace of a discal pattern of brown Its measurements (in millimeters) are as follows Length of body, 27, length of pronotum, 8, greatest width of pronotum, 11, length of tegmen, 24, greatest width of tegmen, 10

Nauphoeta idonea, new species Plate 10, fig 43

Closely related to *N heydeniana* Saussure, having the same general build and shape but differing in its somewhat smaller size, in the marginal field of the tegmina being somewhat narrower, in the humeral trunk of the same being more evenly arcuate and not subsigmoid, in the cross-veins of the scapular field and adjacent section of the discoidal field of the tegmina virtually lacking the small strumose thickenings which are to be seen in *heydeniana,* in the pronotum being uniformly grayish ochraceous and not contrasted as in the typical form of *heydeniana,* in the antennae being

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[76] In Grandidier, Hist Phys Nat et Polit Madagascar, XXIII, Blattides et Mantides, p 83, pl III, fig 32, (1895)

entirely reddish instead of having the two proximal segments pitch black, and the limbs rufescent in their entirety, instead of in part at least pitch black

The general appearance and color of this species suggests a diminutive edition of *N invisa,* described above

Type — ♂, Diego Suarez, Madagascar 1907 (G Bénard) [Paris Museum]

Size quite small (for genus), form short, robust, much resembling that of *N i invisa,* general outline elliptical, surface much as *N i invisa*

Head as seen from dorsum with most of occiput visible cephalad of pronotum, in cephalic aspect very broad cordiform, its greatest width across the eyes subequal to the depth of head, occipital line, seen in same aspect, but moderately arcuate, slightly marked off from the more distinctly arcuate eye outlines, least inter-ocular space but slightly narrower than that between the internal margins of the antennal scrobes (as 3 5 to 3 8), face appreciably subdeplanate, rounding laterad into the subtumid infra-antennal areas palpi moderately stout, ultimate article with its length slightly greater than that of the penultimate article (as 2 5 to 2 25), moderately securiform, its greatest depth contained three and one-eighth times in the article's length (as 8 to 2 5), penultimate article robust infundibuliform, antepenultimate article quite stout, deep, subcompressed, its length faintly greater than that of the ultimate (as 2 9 to 2 5) Antennae incomplete, proximal article relatively long, equal to length from infra-ocular portion of antennal scrobes to lateral base of clypeus

Pronotum with much the same general form as *N i invisa,* its greatest length contained approximately one and two-fifths times in its greatest width, general form trigonally subtrapezoidal, its greatest width at about the caudal third cephalic margin of a very poorly defined but still evident supra-cephalic cucullate section moderately arcuate, broadly rounding laterad into the longer, caudad divergent, moderately arcuate lateral margins, which reach to the distinct though rounded rectangulate lateral angles, caudo-lateral margins passing almost without differentiation into the true caudal margin, the whole broadly arcuate except for very weak sinuations flanking the thereby slightly accentuated median section, cephalic margin very narrowly, lateral and caudal more broadly cingulate, the caudal in higher relief than the lateral surface of pronotum with its contour as in *N i invisa* except for a very faint supra-cephalic constriction which produces a faint cucullation or "cowling" of that portion of the pronotum, this, however, less marked than in *N silacea* and not accompanied by impressed sulciform lines as in that species, surface texture largely cribose impresso-punctulate, more or less slurred into linear, usually transverse groups, producing particularly cephalad and caudad on the pronotum areas of minute etched lines

Tegmina surpassing the abdominal apex by no more than one-fourth the pronotal length, broad lanceolate, width contained twice in its length, texture quite dense and subcoriaceous, surface in areas of close reticulation rather strongly cribrose impresso-punctate, elsewhere the areolation is distinctly to moderately longitudinal costal margin as a whole regularly arcuate, apex well rounded, sutural margin with its proximal three-fourths weakly arcuate, almost straight, in distal fourth rather strongly arcuate to apex, marginal field moderately broad, less so than in *heydeniana* or *invisa*, at its broadest point equal to slightly more than one-third the greatest width of the anal field, distad its definition is not clearly marked but it falls slightly short of apex of anal field, scapular field appreciably broader than marginal (as 3.5 to 2.5), anal field very broad and full, its greatest width contained but one and seven-tenth times in its greatest (diagonal) length. marginal field coarsely cribrose impresso-punctate, scapular field with the costal veins and intercalated nervures not sufficiently differentiated to permit their ready distinction, the whole field with its areolation very fine and involved, humeral trunk moderately arcuate, this more definite proximad, in no way sigmoid, discoidal sectors fifteen in number, really irregular but as a whole rather evenly placed, intercalated nervures distinct and numerous, usually three to an interval, cross-veins in general oblique, only very weak intimations of strumose thickenings present on them in the area near the humeral trunk, and these nearly all in the scapular field, anal vein strongly arcuate except in its distal two-sevenths, where it is faintly sigmoid to its juncture with the sutural margin, which is at the proximal third of the latter, axillary veins not sharply distinguishable from the single intercalated nervure between the axillaries, eleven of the latter recognizable. Wings in repose reaching to the tegminal apices, the alar apices agreeing with the latter in shape.

Ultimate tergite (supra-anal plate) with its produced portion low arcuato-trigonal, shallowly V-emarginate mesad, this broader than deep, the resulting bilobations obtusely rounded. ultimate sternite (subgenital plate) of the same asymmetrical type as that of *N. silacea* described on a preceding page, styles similar to but slightly shorter than those of *N. silacea*. cerci relatively short and stocky, their greatest evident (proximal) width contained less than twice in their length, tapering, blunt acute, external margin low carinato-cingulate as in related species.

Limbs relatively short, moderately robust, femora with all ventral margins lacking true distal spines except the ventro-caudal ones of the cephalic and median pairs, piliform series of ventro-caudal margin of cephalic femora full although weaker distad, median and caudal femora distinctly compressed, relatively deep, the dorsal margin of each moderately arcuate, ventral margins, particularly of caudal femora, faintly sigmoid in outline as seen from venter, median and caudal tibiae moderately compressed, seen from internal face former are subequal in width in distal half, latter in distal three-fifths. caudal tarsi short and stout, incomplete in type, but proximal article is seen to be subequal in length to that of the succeeding three articles combined, proximal article with the pulvillus extending almost to its base.

Allotype.—♀, same data as type. [Paris Museum.]

Differing from the above description of the male (type) in the following noteworthy features.

Form similar to but size greater than in male.

Head, pronotum and tegmina as in male (type).

Ultimate tergite (supra-anal plate) moderately transverse, subtrapezoidal, greatest median length contained two and one-third times in greatest proximal width, lateral margins arcuate convergent to the broadly rounded bilobate distal margin, the median subtrigonal emargination shallow and broad. ultimate sternite (subgenital plate) broad subtrigonal, its median length equal to two and one-half times its proximal width, subcercal emarginations shallow and very broad but well marked.

Limbs as in male.

General color of dorsal surface clay color, darkening on the pronotal disk to tawny-olive, ventral surface in general bister, limbs proximad to and included trochanters dull orange rufous. Head with occiput of the dorsal color, remainder of head dorsad to occipital interspace quite deep bister, distal section of mandibles, labrum and ventral half of clypeus dull ochraceous-orange, palpi of ventral color, eyes fuscous-black, antennae dull orange rufous. Pronotum with lateral areas nearer the general dorsal color than the appreciably darker disk, the two tones, however, passing imperceptibly into one another, cephalic margin narrowly bordered with light ochraceous-buff, caudal margin obscurely and irregularly beaded with tawny-olive and dull ochraceous-buff, faint intimations of a partial lyrate discal pattern traced in buckthorn brown. Tegmina with much of venation of discoidal field obscurely pencilled in pale snuff brown, the normally covered portion of dextral tegmen lightly washed with snuff brown, against which the venation is relieved in pale bister, humeral trunk distinctly lined with mummy brown to prout's brown in proximal fourth of tegmen, paling distad, the pencilling there dying out. Venter of abdomen with sternites each slightly darker in distal half, as a whole sprinkled with slightly elevated dots of clay color, lateral projecting borders of tergites as seen from venter lined with ochraceous-buff, ultimate sternite (subgenital plate) narrowly bordered mesad and cerci briefly tipped with buffy. Femora rather indefinitely clouded distad with fuscous, the tarsi marked laterad and distad with the same, tibial spines of the limb color proximad, becoming mummy brown distad.

MEASUREMENTS (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum	Length of tegmen	Greatest width of tegmen
♂, *type*	19.5	6	8.5	16.1	8
♂, *paratype*	18.1	5.8	8	14	6.4
♀, *allotype*	24	6.9	9.8	19	9

In addition to the type and allotype I have examined a female bearing the same data as the type, and a male and female labelled "Diego Suarez?" collected in 1903 by the Foreign Legion and from the Paris Museum. These specimens, which show no noteworthy differences from the type and allotype, I am considering as paratypes.

The Genera Stilpnoblatta and Isoniscus

STILPNOBLATTA Saussure and Zehntner

1895 *Stilpnoblatta* Saussure and Zehntner, Rev. Suisse de Zoologie, III, pp. 12, 44.

Genotype (by monotypy).—*Parahormetica bengalensis* Saussure, 1869, from Bengal.

In 1908 Shelford described the first African species of this genus from the Belgian Congo,[77] following it with a second one in 1911[78] Of neither of these species in the male sex known, and the diagnosis of the second, i e *minuta*, is most exceedingly brief and unsatisfactory

I have now before me a considerable series representing both sexes of the genotypic species *S bengalensis* (Saussure),[79] from the Hebard Collection, and the congeneric character of the African forms of the genus here discussed is evident

While I am as yet unacquainted with the previously described African species except from the literature, I have before me two closely related but undescribed forms from that continent, which appear to differ very considerably from those previously known, and in order to facilitate future work I have prepared a tentative key for the separation of the African species from the genotype and from one another It is to be understood that my interpretations of the previously described African species have been drawn solely from the literature and may be subject to modification when material of these forms is available

It is now possible to say with certainty that *Stilpnoblatta* must be removed from the Perisphaerinae and placed in the Panchlorinae, in the general neighborhood of *Pycnoscelus* This has largely been due to the recognition of the fully alate male sex When the two genera are compared they are found to be quite closely related, the chief differences being in *Stilpnoblatta* the broader, more deplanate face with more sharply and narrowly rounded occipital angle, broader interocular space and the coarser, less glabrous tegminal venation of the male In addition in the female the alar organs are greatly reduced, the tegmina lateral and lobate, the wings absent

In the absence of knowledge of the male in all of the African species, the following key deals solely with characters of the female sex

1 Size very small (body, 8 mm , pronotum 2 8 × 3 9) Ultimate abdominal tergite (supra-anal plate) with distal margin entire, not emarginate or reflexed *minutissima* Shelford
   Size larger (body, 12–13 2 mm , pronotum, 3–4 × 5–6 88) Ultimate abdominal tergite (supra-anal plate) with distal margin emarginate mesad or at least lightly reflexed . 2
2 Ultimate abdominal tergite (supra-anal plate) with a medio-longitudinal carina, its distal margin at most lightly reflexed Tegmina extremely short (1 2 mm), not distinctly surpassing distal metazonal border *minuta* Shelford

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[77] *Stilpnoblatta minutissima* Shelford, Mém Soc Entom Belg , XXV, p 235 [♀, Umangi (? error for Ubangi), Belgian Congo]

[78] *Stilpnoblatta minuta* Shelford, Wissensch, Ergebn , Deutschen Zent.-Afrika-Expedit 1907-1908 III, Zool I, Lief 16, p 504 [♀ , Kissenji, Lake Kivu]

[79] *P[arahormetica] bengalensis* Saussure, Mél Orthopt , I, fasc 2, p 104 [♀, Bengal] The species was very poorly figured by Saussure and Zehntner, Rev Suisse de Zoologie, III, pl I, fig 8, (1895)

Ultimate abdominal tergite (supra-anal plate) lacking a medio-longitudinal carina, its distal margin with a distinct median emargination Tegmina longer, distinctly surpassing distal metazonal border 3

3 Head with occipital interspace between eyes very broad, exceeding half the greatest width of head across eyes Exposed portion of tegmina not strongly transverse, usually with length and breadth subequal or slightly longer than proximal width (Face not strongly deplanate) *bengalensis* (Saussure)

Head, with occipital interspace between eyes not exceeding half the greatest width of head across eyes Exposed portion of tegmina strongly transverse, broader proximad than length distad from caudo-lateral angle of pronotum 4

4 Head with face moderately deplanate, very narrowly rounded over facio-occipital angle into occiput, no definite carination to angle Occipital interspace between eyes narrower, not exceeding two-fifths of width of head *nugax*, new species

Head with face more sharply deplanate, cut off from occiput by a definite interocular subcarinate ridge at facio-fastigial angle Occipital interspace between eyes broader, subequal to one-half of head width *planiceps*, new species

Stilpnoblatta nugax, new species Plate 10, figs 52-54

The more evident diagnostic features are given in the above key From *minutissima* the larger size and emarginate ultimate tergite are differential, the non-carinate character of the latter and the longer tegmina from *minuta*, while the much flatter face and very distinctly sharper occipital angle and lesser ocular space will at once distinguish *planiceps* The genotype *S bengalensis* can at once be distinguished by the greater interocular space and tegminal proportions

Type —♀, Forest region of Hollis, Adja-Oueré and Ilimon,[80] Plateau of Zaguanado and Ketou, Dahomey February, 1910 (P Ducorps) [Paris Museum]

General outline ovate, dorsum moderately convex, onisciform, its surface moderately polished

Head almost entirely hidden under pronotum, occipital region but narrowly visible from dorsum seen in facial aspect general outline is cordiform, with length and breadth subequal, occipital line but slightly arcuate, eyes not at all prominent, not breaking general outline of head, face appreciably deplanate, narrowly passing into occiput without a definite angulation, occipital interspace between eyes equal to two-fifths of greatest width of head, occiput in longitudinal section moderately arcuate, eyes narrow

Pronotum strongly transverse, greatest median length contained approximately one and three-fifth times in greatest width across caudo-lateral angles, seen from dorsum lateral and cephalic margins broadly and regularly arcuate except for a supra-cephalic flattening, which section seen in cephalic aspect is moderately arcuate dorsad, caudal margin gently arcuate, slightly sigmoid laterad, caudo-lateral angles subproduced rectangulate, lateral and cephalic margins very narrowly cingulate. Mesonotum with normally exposed median portion of caudal margin straight. Metanotum with caudal margin broadly concave, caudo-lateral angles slightly acute, lateral margins moderately convex

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[80] Illemon on the French labels The spelling used above is that of English atlases

Tegmina in greatest costal length almost equal to that of the pronotum, apex much surpassing distal margin of mesonotum, greatest proximal width appreciably greater than length distad from caudo-lateral angle of pronotum, lobiform, lateral margin arcuate, cingulate, apex narrowly rounded, distal margin strongly oblique sub-sigmoid from the very short sutural section into which the distal passes, interspace between tegmina subequal to width of a single tegmen, texture subcorneous, venation little evident, a rudimentary humeral trunk and anal vein indicated with traces of radiating costal veins and subparallel axillary veins

Abdomen broad, caudo-lateral angles of all tergites moderately acute-produced, the lateral sections slightly upcurved, ultimate tergite (supra-anal plate) transverse subrectangulate, greatest length half of proximal width, lateral margins sigmoid, broadly rounding into the bilobate distal margin which is distinctly but shallowly emarginate mesad with a sharply impressed medio-longitudinal sulcus in distal fourth of dorsal surface, which as a whole is faintly concave distad of a broadly triangular but weakly defined proximal area, cerci very short and broad, depressed, subtrigonal, not reaching to distal margin of ultimate tergite, apex blunt acute Ultimate sternite (subgenital plate) broad, transverse, distal margin emarginate ventrad of cerci, arcuate mesad

Limbs very robust, particularly the median and caudal which have the femora moderately arcuate, longitudinally, strongly compressed and proportionately very deep, the tibiae, and particularly the caudal, strongly compressed, ventral margins of median and caudal femora unspined except for distal, caudal tarsi with proximal article subequal in length to remaining ones combined

General color above blackish fuscous, venter and limbs cinnamon-brown, sometimes (type) becoming ochraceous-tawny on the coxae and femora. Pronotum with or without (type) elongate trigonal marginal areas of pale buff on the supra-ocular portion of the cephalic margin, the caudal margin bearing a series of small dull olive-buff blotches, four (in type) or more in number, sometimes fewer by fusion, irregular in shape and variable in size, often containing enclosed punctuations of the general color, the more lateral ones larger than the others and occupying the caudo-lateral angles Caudo-lateral angles of the abdominal tergites similarly maculate but these areas more regularly subquadrate, more sharply defined and not punctate, those on the second tergite usually (in type) the larger, ultimate tergite with a pair of pale areas distad and apices of cerci similarly colored Head with face mars brown (type) to mummy brown, occiput ochraceous-buff, with or without (type) four closely-placed parallel longitudinal fuscous lines eyes black, antennae tawny (type) to fuscous

Length of body, 13 2 mm , length of pronotum, 3 78; greatest width of pronotum, 6 72, length of tegmen caudad of pronotum, 2 52, proximal width of tegmen, 3 36, greatest width of abdomen, 8 5

In addition to the type I have before me an adult female from the Upper Uele, Belgian Congo (June, 1925, L. Ghesquière), belonging to the Museum of the Belgian Congo, and three immature individuals, one male and two females, in the instar preceding maturity, bearing the same data as the type, except that two lack the month of capture, and in the collection of the Paris Museum and the Academy The Upper Uele specimen fully agrees with the type in all essential features, showing only certain color differences set forth in the above description, and is considered a paratype The immature individuals are slightly lighter in color than the adults, showing more clear pitch brown along the segmental margins, while the face is more blackish in one than in the others The dorsal surface, particularly of the abdomen, meso- and metanota in the immature individuals is distinctly micro-tuberculate, a condition not indicated in the adult females The immature male shows very evident rudiments of both tegmina and wings

It is seen from the material now in hand that the species is broadly distributed along the northern edge of the Forest Province

Stilpnoblatta planiceps,[81] new species Plate 10, figs 55 and 56

The principal features which distinguish *planiceps* from *nugax* have been given above in the key to the species In addition all the tibiae, but particularly the median and caudal, are somewhat more strongly compressed and in consequence more lamellate expanded transversely than in *nugax*

Type —♀, Carnot, Upper Sanga River, Middle Congo, French Equatorial Africa August, 1908 (Dr J Kerandel) [Paris Museum]

As *S planiceps* is in most features quite similar to *S nugax* the present description is very largely comparative with the preceding one of the latter

Size, form and surface as in *nugax*

Head in shape and proportions, and extent of occipital exposure as seen in dorsal aspect as in *nugax* face strongly deplanate, abruptly passing into the longitudinally arcuate occiput by a sharp subcarinate transverse interocular ridge, which markedly cuts off the face from the occipital region and accentuates the flattening of the face, occipital interspace between eyes broad, equal to virtually one-half of head width, eyes as in *nugax*

Pronotum, mesonotum and metanotum as in *nugax*

Tegmina somewhat shorter than in *nugax*, their greatest marginal length equal to two-thirds that of pronotum, apex well surpassing distal margin of mesonotum, greatest proximal width one and one-half times the tegminal length distad from caudo-lateral angle of pronotum, general form otherwise much as in *S nugax*, texture more corneous and venation indications less evident on the costal side of the humeral trunk than in *S nugax*; interspace between tegmina equal to five-sixths the proximal width of a single tegmen

Abdomen in general features essentially as in *S nugax*, the caudo-lateral angles of all tergites somewhat broader and less decidedly acute, ultimate tergite (supra-anal plate) as in *nugax*, but median emargination slightly more marked and that area lacking any medio-longitudinal sulcus, cerci similar to but slightly sharper at apex than in *nugax*; ultimate sternite (subgenital plate) as in *nugax* but subcercal emarginations subobsolete and medio-distal portion of margin shallowly emarginate

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[81] In allusion to the strongly deplanate face

Limbs as in *nugax* but tibiae, and particularly the median and caudal, more strongly compressed and in consequence with their outlines broader

Coloration as in *S nugax*, the median sections of the mesonotum and metanotum each having in addition a pair of irregular but balanced vermiculate markings of olive-buff, as well as indications of marginal beading of the same color on certain of the abdominal tergites Pronotum with pale triangles on the cephalic margin well developed, while the caudal margin of the same lacks lateral olive-buff areas but possesses a median balanced series of usually connected pale vermiculations Venter cinnamon brown, paling to ochraceous-tawny on the coxae, face largely pitch brown, occiput ochraceous-buff with four subobsolete longitudinal lines of buckthorn brown

Length of body, 12 mm , length of pronotum, 4 03, greatest width of pronotum, 6 88, length of tegmen caudad of pronotum, 2 1, proximal width of tegmen, 3 27, greatest width of abdomen, 8 5

The type is unique The type locality is situated close to the northern edge of the Forest Province, where there is a distinct interdigitation of forest and savanna elements The author is familiar with conditions at that point, having passed through Carnot in October, 1934

ISONISCUS Borg

1902 *Isoniscus* Borg, Bihang K Svenska Vet-Akad Handl, XXVIII, Afd IV, no 10, p 27

Shelford [82] removed this genus from the Panchlorinae, where it had been tentatively placed by Borg, to the Perisphaerinae I have not seen the second species of the genus, *I scaber*, described by Shelford at that time,[83] which however, judging from the description, is very distinct from *sjostedti*.

Isoniscus sjöstedti Borg

1902 *Isoniscus sjostedti* Borg, Bihang K Svenska Vet-Akad Handl, XXVIII, afd IV, no 10 p 28, pl II, fig 3 [♀, Cameroons]

Liberia Mount Coffee; March, 1895 and 1897, (in part R P Currie), eight females (different instars), [U S N M and A N S P] Clay Ashland, 1895, (Mrs Sharp), two females, two small immature females, [U S N M] Ghanga, September, (J Bequaert); one female Cape Palmas, (Nasmyth); one female, [U S N M] No exact locality, 1914, two small immature females, [U S N M]

Whether this very bizzare blattid will prove to be the apterous female of an already known species of another genus, based on an alate male, remains to be determined The specimens before me agree fully in character and size (except for the immature ones) with Borg's description.

The entire information we have as to its habits is that its original collector (Sjostedt) found it under decaying wood.

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[82] Mem Soc Españ Hist Nat, I, p 481, (1909)

[83] Idem [♀, Spanish Guinea]

PERISPHAERINAE

The Genus Agis and the West African Species of Pseudoglomeris

The subfamily Perisphaerinae is represented in South and East Africa by a highly diversified and in many cases exceptionally specialized group of genera, but in the Lower Guinea Forest District and its general vicinity the subfamily is a much less conspicuous and varied element in the blattid fauna Of the relatively few species of the group known to me from the Cameroons, Gaboon, French Congo and Belgian Congo, five belong to the recently characterized genus *Agis*[84] and two to the West African subgenus *Fanoblatta*[85] of the otherwise Oriental genus *Pseudoglomeris* Both of these entities have as their types species described in 1883 by Gerstaecker, and recently having had these types before me, it seems advisable to put together all the information regarding the genera contained in the extensive African blattid series now in my hands for study

AGIS Rehn

1933 *Agis* Rehn, Proc Acad Nat Sci Phila, LXXXIV, p 464

Genotype (by original designation) —*Derocalymma* (*Cyrtotria*) *scabricollis* Gerstaecker

The characters of the genus and its relationship to *Cyrtotria* were fully discussed in the original generic description

In distribution *Agis* is known only from the West African region between the Cameroons and the mouth of the Congo, extending inland, as at present known, only along the Congo as far as Brazzaville

As the female sex is known of but two species the following key has been based entirely on the males

Key to Species (Males)

1 Occipital interspace between eyes not equal to half that between ocellar spots Rim-like caudal margin of pronotum bearing decided crenato-serrations (Occiput without indication of a transverse subangulation) . 2

Occipital interspace between eyes equal to or exceeding half that between ocellar spots Rim-like caudal margin of pronotum with at most minute crenulato-serrulations (Anal field of tegmina with at least indications of distinct or with well developed intercalated nervures) 3

2 Pronotum proportionately broader, greatest width nearly subequal to length, lateral gutters of pronotum not broadly excavate, cephalad not crossing or subordinating median carina, major asperities of pronotal disk smaller but more numerous and closely placed, lateral bands of pronotum narrower cephalad, caudal margin of disk with crenato-dentations marked and clearly cut . *scabricollis* (Gerstaecker)

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[84] Proc Acad Nat Sci Phila, LXXXIV, p 464, (1933)

[85] Idem, LXXXIV, p 469, (1933)

Pronotum proportionately longer, greatest width appreciably less than length, lateral gutters of pronotum much more broadly excavate, cephalad crossing and subordinating median carina, major asperities of pronotal disk larger, fewer and more widely spaced, lateral bands of pronotum broader cephalad, caudal margin of disk with crenato-dentations lower and blunter *duchaillui*, new species

3 Pronotum proportionately longer, narrower, latero-cephalic portions of disk broadly concavo-excavate, in transverse section distinctly tectate across median carina, all asperities of pronotal disk coarser, in profile dorsal line of disk is straight except briefly caudad Face as a whole concave transversely, this extending well dorsad between eyes and not localized to interocellar region, occiput without a transversely disposed subangulation at dorso-internal angles of eyes *fictor*, new species

Pronotum proportionately shorter and broader, latero-cephalic portions of disk not broadly concavo-excavate, this area much less tectate across median carina, all asperities of pronotal disk finer and denser, in profile dorsal line of disk is low, but distinctly and regularly arcuate Face with impressed area virtually limited to a transverse interocellar section, occiput with a moderate but definite and distinct transverse subangulation at dorso-internal angles of eyes 4

4 Size larger (body, 12 mm pronotum, 3 78) Head broad, greatest breadth across eyes faintly greater than depth of head, interspace between eyes not greater than four-fifths that between internal margins of ocellar spots Lateral gutters of pronotum broadening cephalad, internal face of lateral bands broader, more cucullate dorso-cephalad, asperities of surface of pronotal disk coarser, dorsal margin of lateral bands of pronotum sinuate in profile Intercalated veins of tegmina always much less evident than basic venation Limbs proportionately more elongate *peltatus*, new species

Size smaller (body, 10 5 mm , pronotum, 3 36) Head not as broad proportionately, greatest breadth across eyes and depth of head subequal, interspace between eyes very nearly equal to that between internal margins of ocellar spots Lateral gutters of pronotum not broadening cephalad, internal face of lateral bands narrower, less cucullate dorso-cephalad, asperities of surface of pronotal disk finer and denser, dorsal margin of lateral bands of pronotum straight in profile except very briefly cephalad Intercalated veins of tegmina as a whole nearly as evident as basic venation Limbs proportionately shorter and more robust *pusillus*, new species

Agis scabricollis (Gerstaecker)

1883 *Deroc*[*alymma*] (*Cyrtotria*) *scabricollis* Gerstaecker, Mitth Naturw Ver von Neu-Vorpomm u Rugen, Greifswald, XIV, p 74 [♂, Dongila, Gaboon]

1908 *Cyrtotria scabricollis* Shelford, Ann and Mag Nat Hist, (8), I, p 174, pl. X, figs 18 (♂) and 24 (♀) (In part?) [Examined type and reported female from Cameroons [86]]

1933 *Agis scabricollis* Rehn, Proc Acad Nat Sci Phila, LXXXIV, p 465, pl. XXXII, figs 14-16 [Redescription and figures of type]

Of this species I have seen only the male type, belonging to the Zoological Museum of the University of Greifswald Shelford has figured this specimen,[87] but his illustration is so sketchy and incorrect no subsequent worker could with certainty determine the species from it This is said with full knowledge of Gerstaecker's type, which, fortunately, I have been able to figure with greater care, in addition to presenting a full redescription of it [88]

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[86] For consideration of this female see accompanying discussion

I feel quite certain that the Cameroons female considered to be that sex of *scabricollis* by Shelford [89] does not belong to this species, but probably represents the female sex of *A duchaillui* described on a succeeding page In addition to any geographic reasons for this suggestion, there is the size correlation of this specimen, which indicates *duchaillui*, the character and distribution of the discal tubercles, the arcuation of the dorsal line of the pronotum when seen in profile and the general shape of the lateral bands of the same, all of which are nearer what we find in the male of *duchaillui* than in that of *scabricollis* These comparisons, of course, have been drawn from Shelford's figure of the female, which may be no more reliable than that given by him of the male

If we eliminate the female specimen recorded by Shelford from consideration in connection with *scabricollis*, our knowledge of the latter's distribution is solely the locality of the type, which was taken at Dongila on the Gaboon River, not far from Libreville

Agis duchaillui,[90] new species Plate 10, fig 48, pl 11, figs 57 and 58

? 1908 *Cyrtotria scabricollis* Shelford, Ann and Mag Nat Hist, (8), I, p 174, pl X, fig 24 [Female only, Cameroons] (Probably not *scabricollis* Gerstaecker)

The features which are given in the key for the differentiation of this species from *scabricollis*, its nearest ally both morphologically and geographically, will serve to distinguish it with little difficulty The longer, narrower, rather more scoop-like pronotum, with its more ample gutters, more pronounced cephalic rim and more crassly tuberculate surface will at once indicate the species Unfortunately the unique male type, which was damaged at some time in the past, has been glued securely on a narrow card, so that features of the ventral surface are almost entirely hidden and can be used in a description to but a minor degree, as the condition of the specimen makes its removal hazardous

Type — ♂, San Benito River, Spanish Guinea 1885 (Guiral) [Paris Museum]

Size relatively large for the genus, general form much resembling that of *scabricollis*

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[87] Ann and Mag Nat Hist, (8), I, pl X, fig 18, (1908)

[88] Proc Acad Nat Sci Phila, LXXXIV, pp 465-468, pl 32, figs 15-16, (1933)

[89] Ann and Mag Nat Hist, (8), I, p 174, pl X, fig 24

[90] In memory of Paul B Duchaillu, pioneer naturalist in the Gaboon and Muni River regions

Head cordiform, greatest width across eyes but slightly less than greatest depth of head (as 48 to 53), eyes moderately prominent, sub-bullate, occipital interspace between eyes narrow, less than one-third that between the ventral points of ocellar spots (as 4 to 14), occipital area well rounded longitudinally, without any indication of a transverse angulation, face between ocellar spots and antennal scrobes shallowly concave transversely, this tendency obsolete on lower face, across face at level of lower border of ocellar spots is situated a transverse shallow impression, surface of face and occiput irregularly impressed, cribroso-punctate, less distinct ventrad on face, antennae incomplete in type

Pronotum elongate semi-elliptical in outline as seen in dorsal aspect, the greatest caudal breadth slightly less than the greatest length of the pronotum (as 47 to 53), in the same view the lateral margins gently then more decidedly converge arcuately to the definitely narrow but well rounded cephalic extremity, caudal margin of pronotum in general moderately convex arcuate, the margin itself sublamellate and bearing approximately eight low undulate crenulations, on the internal side the marginal flange is set off by a distinct transverse subsulcate impression, which is partially interrupted by the median ridge, lateral gutters broadly indicated, well excavated, cephalad virtually joining although narrowly crossed by the median carina, caudad the gutters regularly narrow, are not deeply incised and show four glandular foveae, surface of disk of pronotum, as well as the vicinity of the caudal transverse impression, thickly but irregularly, sharply and deeply impressed cribroso-punctate, beneath which there is a fairly regular pattern of relatively sharp pustulose nodes, median carina definite but weak, rather finely cut cephalad on disk, subobsolete mesad and low, substrumose caudad lateral bands broad as seen in profile, at cephalic third slightly deeper than at caudal sixth, dorsal margin of bands entire, ventral margin distinctly but not coarsely serratulate, surface of bands distinctly shagreenous, typical carinae as in *scabricollis*

Tegmina and wings when in repose surpassing the apex of the abdomen by two-thirds of the length of the pronotum Tegmina with greatest width (at distal fourth) contained about three and nine-twentieth times in the greatest tegminal length costal margin in large part shallowly concave from the very brief proximal arcuation to the distal third, whence the margin is regularly arcuate to the rather narrowly rounded apex marginal field as in *scabricollis*, anal field as in *scabricollis* discoidal sectors and anal vein as in *scabricollis*, axillary veins seven to eight in number, rarely bifurcate, evenly concentric, without intercalated nervures, cross veins numerous and moderately regular.

Abdomen with features as already described for *scabricollis* but sinistral style damaged and lacking

Caudal limbs with tarsi incomplete and proportions not ascertainable

General color of dorsal and ventral surfaces russet, paling to hazel distad on the tegmina, lateral bands of pronotum darkening to mars brown along ventral margins, limbs and cerci buckthorn brown

Length of body, 15.2 mm , length of pronotum, 4.45; greatest (caudal) width of pronotum, 3.94, length of tegmen, 13.3; greatest width of tegmen at distal fourth, 3.86

I have seen only the type of this species As stated above under *A scabricollis* it is quite probable the female individual referred to the latter species by Shelford in 1908, instead represents *duchaillui* If this is the case the present insect occurs in both Spanish Guinea and the Cameroons

Agis fictor,[91] new species Plate 10, fig 49, pl 11, figs 59 and 60

The greatly elongate pronotum with its exceptionally scoop-like character, and the expansion of the lateral gutters cephalad so that the latero-cephalic portions of the disk are markedly concave, giving to the pronotum a more spatulate appearance than is seen in any of the other forms of the genus, will at once serve to distinguish this very distinct species In addition the male of *fictor* is unique in having the dorsal line of the pronotal disk almost entirely straight as seen in profile, the males of the other forms having this regularly arcuate to varying degrees

Type — ♂, Congo da Lemba,[92] District of Lower Congo, Belgian Congo February to March, 1913 (R Mayne) [Museum of the Belgian Congo]

Size medium for the genus, general form more slender and proportionately more elongate than in *scabricollis* and *duchaillui*

Head cordiform, greatest width across eyes subequal to depth of head, eyes moderately prominent, sub-bullate but more evenly rotundate than in *duchaillui*, occipital interspace between eyes equal to five-eighths that between the internal borders of the ocellar spots, the broad occiput plane transversely, not at all concave, and lacking any indication of a transverse carinate ridge, face ventrad of occiput largely concave transversely, this marked between the ocellar spots, that portion immediately dorsad of the clypeus transversely impressed,[93] surface of occiput hardly at all punctulate, that of concave portion of face sparsely but distinctly impresso-punctate, antennae damaged in type, remaining articles moniliform, short, particularly those for some distance distal of the third from the base

Pronotum as seen in dorsal aspect with outline very elongate semi-elliptical, the greatest caudal breadth slightly less than seven-eighths of the greatest pronotal length (as 42 to 50), lateral margins approximately subparallel in caudal two-fifths of pronotum, thence cephalad obliquely arcuate-convergent to the quite narrow but rounded cephalic extremity, caudal margin of pronotum transversely low arcuate, appreciably sub-lamellate, marginally with only the most minute spaced crenulato-serrulations, intermarginal transverse sulcation as distinctly but more finely impressed than in *duchaillui*, similarly but more delicately interrupted by the median carina, lateral gutters of dorsal surface caudad much more narrowly and finely indicated than in *duchaillui*, cephalad broadly ampliate toward the median line by the concavity of the surface of the tectate two-fifths of pronotal disk, glandular foveae at least eight in number, four placed caudad in the narrow portion of the gutters, the others more cephalad where the gutters have widened, and where they are partially covered and somewhat hidden by a diagonally placed series of small lappet-like nodules surface of disk of pronotum very largely covered with a dense but irregularly placed pattern of impresso-punctations as found in *duchaillui*, this also involving the caudal transverse sulcation and the caudal margin, while cephalad on the disk, where in transverse section the form within the lateral gutters is distinctly tectate, the impressed punctations give way to a regularly placed pattern of recurved shagreenous teeth, those laterad of the median area directed caudo-laterad, those in the median section pointing directly caudad, beneath the pattern of impresso-punctations is a sparser pattern of pustulose nodes much as found in *duchaillui*, but these are smaller, fewer and virtually absent from the more deplanate median section of the disk, median carina obsolete between a marked development cephalad and a moderate indication caudad, the cephalic section being the culminating ridge of an appreciably tectate area which is concavely declivent on either side and which has its surface distinctly shagreenous denticulate in lateral view the dorsal outline of the pronotum is seen to be nearly straight with the cephalic margin gently upcurved in a lip-like fashion lateral bands of pronotum seen in profile very broad when compared with those of *duchaillui*, greatest depth mesad, thence evenly narrowing cephalad by the regular dorsal trend of the ventral margin of the band, caudad of greatest depth the bands narrow but faintly, until very briefly before the caudal margin of the disk the ventral border of the bands sharply curves dorsad and joins the former margin, dorsal margin of bands very weakly sigmoid, virtually entire, ventral margin entire cephalad, in caudal three-fifths serratulate as in *duchaillui*, surface of bands impressed cribroso-punctulate, becoming subshagreenous cephalad, while medio-longitudinally can be seen indications of several low substrumose nodes, in ventral aspect the pronotum is seen to have the lateral sections more compressed than in *duchaillui*, which throws into a more vertical position that area between the ventral margins of the lateral bands of the pronotum and the typical carinae, the tooth at the apex of the latter being much more slender and delicate than in *duchaillui*

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[91] I e a feigner, in allusion to the covered head

[92] About fourteen miles north-east by east of Matadi

[93] As the type has been dried from alcohol, this emphasis may be due to desiccation

Tegmina and wings when in repose surpassing the apex of the abdomen by nearly the length of the pronotum Tegmina narrower than in *duchaillui*, with the greatest width (at distal third) contained three and four-tenth times in the greatest tegminal length costal margin as in *duchaillui*, apex slightly more narrowly rounded than in latter marginal field proportionately narrower than in *duchaillui*; anal field narrower and more sharply acute than in *duchaillui*· anal vein more evenly and less sharply arcuate distad, joining the sutural margin at a more acute angle than in *duchaillui*, axillary veins six in number, with indications of intercalated longitudinal false nervures between at least the more proximal portions of the axillary veins

Abdomen with ultimate tergite (supra-anal plate) proportioned as in *scabricollis*, strongly transverse rectangulate, surface of medio-proximal section transversely ovate subexcavate cerci much as in *scabricollis* but twice as long as median length of ultimate tergite ultimate sternite (subgenital plate) as in *scabricollis* [94] styles as in *scabricollis* except that the dextral is one and one-half times the length of the sinistral [95]

Caudal tarsi with proportions of the metatarsus to whole tarsus as in *scabricollis*, i e two-fifths of the total tarsal length

General color of dorsal surface mars brown, progressively paling distad on the tegmina to dresden brown Head dark, liver brown, antennae dresden brown, paling proximad, palpi ochraceous-tawny Ventral surface prout's brown, ultimate sternite with a base color of pale ochraceous-orange, clouded with pale prout's brown, dorsal surface of metanotum and abdomen ochraceous-buff, intertegminal area of mesonotum of the dorsal color Limbs ochraceous-tawny

Length of body, 12 4 mm , length of pronotum, 4 2, greatest (caudal) width of pronotum, 3 52, length of tegmen, 12 2, greatest width of tegmen (at distal third), 3 52

In addition to the type I have before me a paratypic male bearing the same data as the type, except that no month is specified for 1913 This individual shows no noteworthy difference from the above description and is of the same size as the type

Agis peltatus,[96] new species Plate 10, figs. 46 and 47, pl 11, figs 61 and 62

The broad head, great interocular space, appreciable angulation of the occiput and pronotal form show that *peltatus* is nearest to *pusillus*, described on a succeeding page, but its greater size, more typical lateral gutters and coarser sculpture of the pronotal disk, as well as the sinuation of the dorsal border of the lateral bands of the pronotum, and the less uniform, continuous or pronounced character of the intercalated tegminal venation will serve to indicate this species

Type — ♂ , Mayumbe,[97] District of Lower Congo, Belgian Congo (Deleval) [Museum of the Belgian Congo]

Size medium for the genus, general form more nearly as in *scabricollis*, less slender than in *fictor*

Head broad cordiform, greatest width across eyes slightly more than greatest depth of head, the eyes full and evenly rounded when seen in cephalic aspect, somewhat bullate ventro-laterad but not at all so dorso-laterad, where the eye outline passes evenly into the straight transverse line of the occipital interspace, which is broad, equal to approximately two-thirds the width of the interspace between the internal margins of the ocellar spots

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[94] The type has the margin of this sternite somewhat abnormal in that the characteristic dextral recurved spine-like tooth is lacking The paratype is perfectly normal in this respect, and shows that the condition of this margin in detail is as in the related species

[95] The injury which created the abnormality of the dextral portion of the distal margin of the ultimate sternite, above mentioned, also involved the dextral cercus and dextral style The latter is thus no longer than the sinistral, its distal section being aborted, as is clear from an examination of the paratype

[96] I e armed with the pelta, a light shield

[97] A local term applied to that portion of the District of Lower Congo (Bas Congo) west of the Crystal Mountains, north of the Congo River, adjacent to the Portuguese colony of Cabinda.

(as 11 to 17), the occipital surface not at all concave but subdeclivent ventro-cephalad and dorsad, near the caudal margins of the eyes, bearing a weak but distinct transverse subangulation, surface of face with an area between the ocellar spots, much more limited in extent than in *A fictor*, shallowly concave, the surface of the whole face and less markedly that of the occiput irregularly impressed cribroso-punctulate, transverse impression immediately dorsad of clypeus less marked than in *fictor*, antennae incomplete in type

Pronotum in general form and proportions much as in *scabricollis*, except that the whole is slightly more elongate, the greatest (caudal) width being contained in the greatest length one and one-ninth times (as 39 to 45), outline of lateral and cephalic margins as seen from dorsum as already described and figured by me for *scabricollis*,[98] caudal margin of pronotum with arcuation as in species already discussed, lamellation and crenulation of the border as in *A fictor*, transverse intra-marginal impression as definite but less broadly impressed than in *fictor*, less broken by the median carina, lateral gutters of the dorsal surface very narrowly but deeply indicated caudad, cephalad broadening as they do in *fictor* but slightly less strongly so and with their definition from the discal surface more clearly indicated, glandular foveae on each side ten to eleven in number, five placed in the narrow caudal section of the gutters, the others cephalad where they are shielded dorsad by a series of node-like tubercles surface of disk as a whole more evenly inflated than in either *duchaillui* or *fictor*, in this respect more nearly like *scabricollis*, the cephalic portion of the disk but weakly tectate, surface sculpture with the same elements found in *fictor*, the shagreenous points of the cephalic portion of the disk more thickly and less regularly placed and accompanied latero-cephalad on the disk by low but distinct nodose tubercles, which are distinct from the usual pattern of sparser, more pronounced larger nodes, which in this species are at least as numerous as in the species already treated and are individually smaller, sharper and more asperous, median carina quite sharply indicated cephalad and with surface there having shagreenous denticles, caudad appreciably but less sharply and definitely indicated, obsolete in the central section of the disk in lateral view the pronotum shows a dorsal line very similar to that of *scabricollis* but less domed and more evenly declivent cephalad lateral bands of pronotum when seen in profile essentially as in *scabricollis*, their greatest depth faintly caudad of their middle, thence caudad they regularly narrow by the faint caudad declivence of the dorsal margin of the bands, ventral margin serratulate as in other species, the surface of the bands thickly covered with caudad-recurved shagreenous denticles, which cephalad are roughly linear in disposition, in ventral aspect the pronotum is much as in *fictor* except that the area between the ventral margin of the bands and the typical sulcus is slightly broader

Tegmina surpassing apex of abdomen by a distance subequal to pronotal length, greatest width at distal third contained three and sixth-tenth times in greatest length of same, apex narrowly rounded, proximal section of marginal field proportionately broader than in *A fictor*, adjacent section of humeral trunk more sharply sigmoid than in latter species; anal vein with curvature as in *A fictor*, reaching sutural margin at two-fifths the length of the latter from its base, anal field with six principal axillary veins, of which the more sutural one is less decided and less complete than the others, intercalated nervures of the field evident but incomplete and not continuous, broken by the more decided transverse rami which impart a quadrate or rectangulate character to the areolation of the field, the intercalated nervures usually mere short medio-longitudinal carinulae in the areolae, often connected laterad by irregular rami Wings in repose very faintly surpassing tegmina, with apex having the same degree of arcuation as that area of tegmina

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[98] Proc Acad Nat Sci Phila, LXXXIV, p 466, pl 32, fig 15, (1933)

Abdomen with ultimate tergite (supra-anal plate) transverse, the greatest median length slightly less than one-third proximal width, distal margin broadly arcuate, more deplanate mesad, surface of tergite distad of a transverse arcuate line subimpressed, ultimate sternite (subgenital plate) essentially as in *A duchaillui* but arcuation of median portion of distal margin slightly lower and more flattened and both stylar diastems smaller and slightly less extensive, styles simple and styliform, the dextral but faintly longer and more robust than the sinistral, the length of the former nearly equal to one-third the distance between the bases of the two styles, cerci as in *A scabricollis*[99] but having only eight evident segments

Caudal tarsi with proportions of metatarsus to whole as in *scabricollis*, i e two-fifths of the total length

General color of pronotum, tegmina and wings prout's brown with a chestnut-brown tinge to the pronotum Both surfaces of abdomen mummy brown, with a narrow lateral bordering of ochraceous-tawny, the terminal tergite and sternite distad bordered with ochraceous-buff Head, except for the ochraceous buccal region and palpi and the fuscous eyes, entirely deep chestnut-brown, antennae incomplete, remaining portion ochraceous-buff washed with fuscous; limbs ochraceous-buff

Length of body, 12 mm , length of pronotum, 3 78, greatest (caudal) width of pronotum, 3 27, length of tegmen, 11 7, greatest width of tegmen at distal third, 3 19

Allotype —♀ , " Kuni,"[100] Mayumbe, District of Lower Congo, Belgian Congo May 23, 1925 (A Collart) [Museum of the Belgian Congo]

Size medium, from subcylindrical, flattened ventrad, apterous, surface at least weakly impresso-punctulate (on abdomen)

Head subelongate cordiform in outline, breadth across eyes equal to seven-ninths of the depth of head, outline of eyes and occiput evenly arcuate when seen in cephalic aspect, occipital interspace between eyes equal to one-third greatest width of head, and two-thirds that between antennal scrobes, a very blunt and weak but evident transverse subangulation present in this area, separating the occiput from the face, interantennal portion of face with a shallowly impressed area, arcuately limited ventrad and dorsad passing indefinitely into the level of the face, the entire head surface distinctly and cribrosely impresso-punctate. Antennae incomplete but at least as long as pronotum, third article three-fifths the length of the proximal one

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[99] See Rehn, Proc Acad Nat. Sci Phila , LXXXIV, p 467, (1933)

[100] I am convinced that this name, which is printed in long-hand on the label, is a transcription error for Kisu, a well-known locality in the Mayumbe region I am entirely unable to find a "Kuni" in the Mayumbe, even in the very detailed Belgian 1924 chart of the Leopoldville quadrant, which is particularly valuable for Mayumbe localities.

Pronotum of the cucullate type found in the males of the genus but stouter, with the rim of the lateral bands flatter and more shovel-like, their internal surfaces less ascending and more deplanate, the lateral gutters more broadly opened, the discal boss of the pronotum higher, fuller, more domed, the caudal margin of the pronotum lacking an intramarginal transverse sulcation, median length of pronotum but faintly more than greatest width lateral margins in dorsal view almost parallel and straight in caudal half, cephalad semicircularly rounded, in lateral view the dorsal line of the pronotal disk is regularly and arcuately ascending from the intermarginal impression to a slightly more deplanate caudal section of the disk, caudal margin of pronotum slightly concave, beaded with low, spaced tubercles lateral gutters deeply impressed mesad and caudad, their much less decided cephalic continuations meeting at an obtuse angle in the supra-cephalic intramarginal impression, broader than in the male, glandular foveolae numerous, their openings less evident than in male sex, less definitely shielded dorsad by node-like tubercles, surface of disk almost completely cribrose impresso-punctate, with less numerous spaced asperous tubercles, which are virtually absent from the flatter meso-caudal portion of the disk, median carinula very weak, subobsolete. lateral bands of pronotum relatively broad, of more even width than in male, dorsal margin nearly straight except toward caudal point, ventral margin evenly arcuate, caudal angle moderately produced caudad of general caudal margin of pronotum, acute, dorsal margin entire, ventral margin serrato-denticulate, lateral surface of bands finely shagreenous, typical sulcus of venter with the caudal tooth very distinct and definitely produced Mesonotum caudad but very faintly broader than pronotum at caudal margin, its caudal margin largely transverse truncate, the caudo-lateral angles very slightly subfalcate produced caudad, lateral margins of mesonotum moderately arcuate, narrowly cingulate, very weakly low serrulate, surface of mesonotum shagreenous laterad, more impresso-punctate mesad with a distinct but low medio-longitudinal carinula, moderately timid humerally and meso-proximad with a transverse truncate groove, which separates the greater portion of the tergite from a meso-cephalic more inflated section of the same Metanotum slightly shorter than mesonotum, caudal margin in general concave, caudo-lateral angles and lateral margins much as in mesonotum, but the former are blunter and the latter more sharply arcuate cephalad, general texture of surface as in mesonotum but median carinula finer, almost no humeral tumidity and no cephalic transverse groove indicated

Abdomen subelliptical in outline, its greatest median width about a fourth greater than caudal pronotal width, subdeplanate, apex in dorsal vein broadly rounded, dorsal surface finely shagreenous laterad, passing to finely impresso-punctulate mesad, ventral surface lightly polished, rather openly impresso-punctulate ultimate tergite (supra-anal plate) transverse, subtrapezoidal, the distal margin moderately broad arcuate, passing evenly into the oblique faintly sigmoid lateral margins, greatest median length slightly less than half greatest proximal width, surface subconcave, subshagreenous, more densely so toward the margin. cerci broad, deplanate, apex acute, length slightly less than half that of ultimate tergite, not distinctly segmented ultimate sternite (subgenital plate) large, its median length contained two and two-fifth times in the greatest proximal width of the sternite, distal margin broad arcuate, faintly sinuate ventrad of the cerci

Limbs very short, the femora quite stout cephalic femora with ventro-cephalic margin having a definite serrulate carinula in the position of the spine series of many blattids, distal spine short and stout, cephalic tibiae with length equal to two-thirds that of femora. median limbs lacking caudal femora subcompressed, caudal tibiae faintly longer than femora, straight, compressed caudal tarsi with proximal article but faintly longer than one-third of total tarsal length, arolium large

General color fuscous brown, tinged with chestnut-brown in the pronotal gutter and on the caudal margins of all the thoracic and abdominal segments, head, coxae and limbs hay's russet, paling to dull zinc orange on cephalic tibiae and all tarsi, antennae buckthorn brown, paling proximad to zinc orange, palpi dull ochraceous; eyes fuscous

Length of body, 14 5 mm , length of pronotum, 4 53, caudal width of pronotum, 4 36, greatest width of abdomen, 6 46; length of caudal femur, 2 1

When the above female is compared with the only known specimen of that sex of the genus, described, figured and referred to Gerstaecker's *scabricollis* by Shelford[101] we note numerous differences As I have already stated on a preceding page I feel the specimen so reported does not represent *scabricollis* but instead belongs to *A duchaillui* described in the present study The exactness of Shelford's figure is open to question, as that of the unique male type of Gerstaecker's species presented on the same plate,[102] is completely erroneous in most of its details, as my own examination and redescription and the very carefully made figure of the pronotum of that specimen, presented in my study of that author's type,[103] will show However, regardless of what the previously known female may eventually prove to be, when the present specimen is compared with Shelford's description and figure it is seen to have the pronotum in outline cephalad distinctly more broadly arcuate and not at all acute, while the distribution of the tubercles on the same is quite different, the lateral bands of more even width and nowhere proportionately as broad as figured, and the caudal production of the same less decided

Agis pusillus, new species. Plate 11, figs 63 and 64.

The small size of this species will at once serve to identify it In addition the other diagnostic features given in the key to the forms of the genus will show the distinctive character of *pusillus*, which is in no way closely related to any other species except *peltatus*

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[101] Ann and Mag Nat. Hist., (8), I, p 174, pl X, fig 24, (1908) [♀; Cameroons]

[102] Idem, fig. 18

[103] Proc Acad Nat Sci Phila , LXXXIV, pp 465-468, pl 32, figs 14-16, (1933).

Type.—♂, Vicinity of Brazzaville, Middle Congo, French Equatorial Africa 1907 (E Roubaud and A. Weiss) [Paris Museum]

Size smallest of the known species of the genus, general form as in other members of the genus

Head cordiform, relatively broad but less so than in *A peltatus*, the greatest depth slightly greater than greatest width across eyes (as 6 to 5.6), latter slightly less tumid than in *peltatus*, occipital interspace between same faintly more than one-third of greatest head width (as 2 to 5.6) and very faintly less than that between ocellar spots, transverse subangulation of occiput quite distinct, the outline of this area faintly arcuate when seen in cephalic aspect, face with a defined transverse interocellar impressed area, which is indefinitely obtuse-angulate in shape, surface of head as a whole, except for the subglabrous occiput, regularly and evenly, but not very closely, impresso-punctate, antennae subequal in length to half of body

Pronotum in general dorsal view much resembling that of *A scabricollis*[104] but with greatest length very faintly longer than greatest caudal width (as 11.5 to 10.3), also much resembling that of *A peltatus* but faintly broader, arcuation of cephalic section of margin exactly as figured for *A scabricollis*, lateral gutters relatively narrow throughout, their cephalic half much less widened than in *A peltatus*, the internal face of the lateral bands much less scoop-like than in that species, glandular foveolae eight in number, the more cephalic ones more closely placed and smaller than the others, the foveolar apertures more exposed and less shielded than in *A. peltatus*; caudal margin of pronotum with arcuation slightly more pronounced than in *peltatus*, virtually lacking the beading found in the other species of the genus, intermarginal transverse sulcus much as in *peltatus* but divided in two very definitely by a medio-longitudinal carina, surface of dorsum of pronotum thickly and sharply shagreenous with a median carination well developed cephalad and caudad and subobsolete in the interval, the pronotal disk with a relatively indefinite but balanced sublyrate pattern of glabrous areas, in profile the dorsal line of the pronotal disk evenly and relatively low arcuate lateral bands as seen in lateral aspect, relatively broad, their greatest width equal to one-fifth the length of the band as seen in lateral aspect, dorsal line of band nearly straight, ventral line nearly straight oblique in cephalic half, passing by a rounded obtuse-angulation into a horizontal straight section of the margin which caudad passes by a quarter-circle arcuation into the caudal margin of the pronotal disk, the dorso-caudal angle of the bands being slightly acute, and, as in all the other known males of the genus, not at all produced, surface of lateral bands closely shagreenous.

Tegmina narrow, the greatest width at distal third contained slightly less than three and a half times in the tegminal length (as 5.5 to 19) margins as a whole as in *A peltatus* marginal field with the widened proximal portion somewhat more regularly attenuate distad than in *peltatus*, anal field more acute than in latter, the arcuation of the anal vein as a whole quite even, joining the sutural margin at a decidedly acute angle, venation as a whole more firmly and regularly marked than in *peltatus*, less undulate, more closely placed, intercalated nervures quite marked, almost as well emphasized as the main nervures, broken only by the cross nervures, particularly evident in the anal field between the six axillary veins, venational areolets as a whole distinctly and quite sharply rectangulate, much less irregular than in *A peltatus* Wings reaching to the tegminal apices when in repose

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[104] See figure of type of *scabricollis*, Proc. Acad Nat. Sci Phila, LXXXIV, pl 32, fig 15, (1933).

Abdomen[105] with ultimate tergite (supra-anal plate) essentially as in *peltatus* but very slightly more transverse, cerci shorter and stockier than in *peltatus*, the length about twice the greatest median length of ultimate tergite (supra-anal plate), ultimate sternite (subgenital plate) as in *peltatus*, the dextral style slightly longer than sinistral

Limbs shorter and stouter than in *peltatus*, caudal tarsi with metatarsus equal to slightly less than two-fifths of total tarsal length (as 16 is to 43)

General color of pronotum russet, obscurely mottled with prout's brown on lateral bands and disk, tegmina slightly darkened to chestnut-brown, head chestnut-brown, eyes mottled dresden brown and fuscous, palpi ochraceous-orange, antennae pale fuscous with approximately three proximal articles ochraceous-orange, coxae and abdomen mummy brown, the abdominal tergites bordered laterad by narrow subtrigonal areas of dull mars yellow, cerci light ochraceous-buff, ultimate sternite narrowly bordered with ochraceous-buff, styles same, limbs ochraceous-orange

Length of body, 10 5 mm , length of pronotum, 3 36, greatest width of same, 3 02, length of tegmen, 10 4, greatest width of tegmen at distal third, 3 27

The type is unique

PSEUDOGLOMERIS Brunner

Subgenus FANOBLATTA Rehn

1933 *Fanoblatta* Rehn, Proc Acad Nat Sci Phila, LXXXIV, p 469 pl XXXII, figs 17-21

Genotype (by original designation) —*Perisphaeria* (*Melanosilpha*) *oniscina* Gerstaecker

At the time the original description of the subgenus was presented I discussed at some length its relationship to restricted *Pseudoglomeris*, of the Oriental Region The male sex of *Pseudoglomeris* (*Fanoblatta*) *oniscinus* was described by Shelford in 1908, but is unknown to me

Key to Species (*Females only*)

1 Surface of entire dorsum with micro-punctulae closer, more evident and as a whole individually deeper Lateral section of caudal margin of pronotum more distinctly concave and the caudo-lateral angles in consequence more falcate than the same margin or angle of mesonotum or metanotum . . *oniscinus* (Gerstaecker)

Surface of dorsum with micro-punctulae more spaced, less evident and as a whole individually shallower Lateral section of caudal margin of pronotum no more concave and the caudo-lateral angles no more falcate than the same margin or angle of mesonotum or metanotum *tolypeutes*, new species

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[105] The type has had the abdomen detached and in repairing it the same has been replaced in an inverted position

Pseudoglomeris (Fanoblatta) oniscinus (Gerstaecker). Plate 10, fig. 50

1883 *Perisph[aeria] (Melanosilpha) oniscina* Gerstaecker, Mitth. Naturw. Ver. Neu-Vorpomm. u. Rugen, Greifswald, XIV, p. 75. [♀ and immature individuals, Abo and Bonjongo, Cameroons.]

1908 *Pseudoglomeris oniscina* Shelford, Deutsch. Ent. Zeitschr., 1908, p. 130. [♂, Cameroons.]

1933 *Pseudoglomeris (Fanoblatta) oniscina* Rehn, Proc. Acad. Nat. Sci. Phila., LXXXIV, p. 470, pl. XXXII, figs. 17-21. [Redescription and figures of type.]

In addition to the Gerstaecker material discussed by me recently, I have before me the following:

FRENCH CONGO. N'kogo, Ogowe, Gaboon, 1902 and 1903, (Boysson,); three females, [Paris Museum and A. N. S. P.]. Ogowe River; two females, one immature female, [Carnegie Museum and A. N. S. P.].

I have no further comments to make on this species, which was discussed at considerable length in my Gerstaecker type study, other than to point to the extension of range made by the additional material examined.

Pseudoglomeris (Fanoblatta) tolypeutes,[106] new species. Plate 10, fig. 51

This species is a close relative of *oniscinus* and without material of both species for comparison its recognition conceivable may cause hesitation. However, in *tolypeutes* the less pronounced sculpture and the distinctly less strongly concave lateral sections of the caudal margin of the pronotum, with the correlated less falcate caudo-lateral productions of the pronotum, should remove doubt as to the identity of material of this species. The use of the accompanying figures should assist in determining females. There is every probability that when both male sexes are known, we shall find other and more decided differential features for the two species.

Type.—♀, Ipamu,[107] Kasai District, Belgian Congo. 1922. (P. Vanderijst.) [Museum of the Belgian Congo.]

As the two species are very similar in the great majority of their features, the following description is comparative with the detailed one which I have already presented of Gerstaecker's type of *oniscinus*.[108]

Size as in *P. oniscinus*, general form and outline similar, surface with micro-punctulae less numerous, less densely placed and more shallowly impressed, abdominal lateral foveae of both dorsal and ventral surfaces as in *oniscinus*.

Head as in *oniscinus*; antennae nearly complete, the portion remaining equal to slightly more than half the body length.

Pronotum with general character as in *oniscinus*, but greatest (caudal) width equal to two and one-fifth times its greatest length, caudo-lateral angles less falcate in their general outline and production, the caudal margin of the pronotum in its median five-eighths nearly straight transverse, not arcuate when seen in dorsal view, the caudal margin of the caudo-lateral productions thence laterad moderately oblique and very faintly concave, the angle of the production while still acute appreciably less so than in *oniscinus* Mesonotum and metanotum with caudo-lateral angles appreciably less acute-produced than in *oniscinus*, their caudal margins laterad less sharply concave

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[106] In allusion to its analogy to that genus of armadillos.

[107] On south bank of Kasai River about 75 kilometers westward of Basongo. Approximate position 4° 6′ S., 19° 36′ E.

[108] Proc. Acad. Nat. Sci. Phila., LXXXIV, pp. 470-471, (1933).

Abdomen as in P *oniscinus* except for sculptural difference in the sparser and shallower micro-punctulae, particularly of the dorsal surface, ultimate tergite (supra-anal plate) with its surface, aside from the micro-punctulae, slightly less impressed laterad than in *oniscinus*

Limbs as in P *oniscinus*

General color uniform pitch black, antennae, buccal region, palpi, cerci and tarsi ochraceous-buff to orange-ochraceous, limbs otherwise mahogany red, eyes black.

Length of body, 13[100] mm , length of pronotum, 3 27, greatest (caudal) width of pronotum, 7 89, greatest width of abdomen, 8 06

The type is unique.

EXPLANATION OF PLATES 8-11

PLATE 8

Fig 1—*Namablatta bitaeniata* (Stål) Dorsal view of male Gemsbok Pan, Bechuanaland Protectorate (× 3)

Fig 2—*Namablatta bitaeniata* (Stål) Dorsal view of apex of abdomen of male Gemsbok Pan, Bechuanaland Protectorate (Greatly enlarged)

Fig 3—*Namablatta bitaeniata* (Stål) Ventral view of apex of abdomen of male Gemsbok Pan, Bechuanaland Protectorate (Greatly enlarged)

Fig 4—*Namablatta bitaeniata* (Stål) Cephalic femur of male to show armament of ventro-cephalic margin Gemsbok Pan, Bechuanaland Protectorate (Greatly enlarged)

Fig 5—*Namablatta bitaeniata* (Stål) Dorsal view of female (allotype) Namutoni District, Southwest Africa (× 3)

Fig 6—*Euandroblatta matabele* new species Dorsal outline of female (type) Bulawayo, Southern Rhodesia (× 4)

Fig 7.—*Euandroblatta curta* (Walker) Dorsal view of apex of abdomen of male Libreville, Gaboon (× 5)

Fig 8.—*Euandroblatta curta* (Walker) Ventral view of styles and margin of ultimate sternite (subgenital plate) of male Libreville, Gaboon (Greatly enlarged)

Fig 9—*Euandroblatta curta* (Walker) Left tegmen of female Lambarene, Gaboon (× 3)

Fig 10—*Euandroblatta curta* (Walker) Dorsal view of ultimate tergite (supra-anal plate) of female Lambarene, Gaboon (Greatly enlarged)

Fig 11—*Euandroblatta kabaka*, new species Dorsal view of ultimate tergite (supraanal plate) of male (type) Mityana, Uganda (Greatly enlarged)

Fig 12—*Euandroblatta kabaka*, new species Left tegmen of female (allotype) Buamba Forest, Uganda Protectorate (× 3)

Fig 13——*Euandroblatta kabaka*, new species Dorsal view of ultimate tergite (supra-anal plate) of female (allotype) Buamba Forest, Uganda Protectorate (Greatly enlarged)

Fig 14.—*Euandroblatta selousi*, new species Dorsal view of apex of abdomen of male (paratype) Lulanguru, Tanganyika Territory. (× 5)

Fig 15—*Euandroblatta selousi*, new species Ventral view of ultimate sternite (subgenital plate) of male (paratype) Lulanguru, Tanganyika Territory (Greatly enlarged)

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[100] The body is slightly curled, so that a straight line measurement would be a millimeter or so greater

Fig 16 —*Euandroblatta clavigera*, new species Dorsal view of apex of abdomen of male (type) Kilometer 311 from Kindu, Belgian Congo (× 5)

Fig 17 —*Euandroblatta clavigera*, new species Ventral view of ultimate sternite (subgenital plate) of male (type) Kilometer 311 from Kindu, Belgian Congo (Greatly enlarged)

Fig 18 —*Euandroblatta clavigera*, new species Outline of left style showing armament of dorsal surface Male (type) Kilometer 311 from Kindu, Belgian Congo (Greatly enlarged)

Fig 19 —*Euandroblatta marshalli*, new species Dorsal view of apex of abdomen of male (type) Salisbury, Southern Rhodesia (× 5)

Fig 20 —*Euandroblatta marshalli*, new species Ventral view of ultimate sternite (subgenital plate) of male (type) Salisbury, Southern Rhodesia (Greatly enlarged)

Fig 21 —*Euandroblatta marshalli*, new species Outline of left style showing armament of dorsal surface Male (type) Salisbury, Southern Rhodesia (Greatly enlarged)

Fig 22 —*Euandroblatta marshalli*, new species Dorsal view of ultimate tergite (supra-anal plate) of female (allotype) Salisbury, Southern Rhodesia (Greatly enlarged)

PLATE 9

Fig 23 —*Leucophaea congicus*, new species Left tegmen of female (type) Faradje, Uele, Belgian Congo (Natural size)

Fig 24 —*Leucophaea congicus*, new species Pronotum of female (type) Faradje, Uele, Belgian Congo (Natural size)

Fig 25 —*Leucophaea congicus*, new species Outline of ultimate tergite (supra-anal plate) of female (type) Faradje, Uele, Belgian Congo (Greatly enlarged)

Fig 26 —*Leucophaea puerilis*, new species Left tegmen of male (type) Lambarene, Ogowe, Gaboon (× 1⅓)

Fig 27 —*Leucophaea puerilis*, new species Caudal limb of male (type) Lambarene, Ogowe, Gaboon (× 3½)

Fig 28 —*Leucophaea maderae* (Fabricius) Left tegmen of male Bitje, Cameroons (× 1⅓)

Fig 29 —*Leucophaea capelloi* (Bolivar) Dorsal view of female Mityana, Uganda (× 1½)

Fig 30 —*Leucophaea capelloi* (Bolivar) Caudal limb of female Mityana, Uganda (× 1¾)

Fig 31 —*Nauphoeta mombuttu*, new species Dorsal view of female (type) Medje, Kibali-Ituri, Belgian Congo (Natural size)

Fig 32 —*Nauphoeta mombuttu*, new species Interocular space of female (type) Medje, Kibali-Ituri, Belgian Congo (Greatly enlarged)

Fig 33 —*Nauphoeta mombuttu*, new species Ventral surface of tegmen showing elevated mediastinal rami Female (type) Medje, Kibali-Ituri, Belgian Congo (Greatly enlarged)

Fig 34 —*Nauphoeta batesi*, new species Left tegmen of female (type) Bitje, Cameroons (× 1⅓)

Fig 35 —*Nauphoeta batesi*, new species Outline of ultimate tergite (supra-anal plate) of female (type) Bitje, Cameroons (Greatly enlarged)

Fig 36 —*Nauphoeta procera*, new species Dorsal view of female (type). Obuashi, Gold Coast (× 1⅓)

Fig 37 —*Nauphoeta procera*, new species Ventral surface of tegmen showing elevated mediastinal rami Female (type) Obuashi, Gold Coast (Greatly enlarged)

PLATE 10

Fig 38 —*Nauphoeta invisa*, new species Dorsal view of male (type) Bitje, Cameroons (× 1⅓)

Fig 39 —*Nauphoeta invisa circumdata*, new subspecies Left tegmen of female (type) Royesville, Liberia (× 1⅓)

Fig 40 —*Nauphoeta silacea*, new species Dorsal view of male (type) Brassaville, Middle Congo, French Equatorial Africa (× 2)

Fig. 41.—*Nauphoeta silacea*, new species. Outline of ultimate tergite (supra-anal plate) of male (type). Brazzaville, Middle Congo, French Equatorial Africa. (Greatly enlarged.)

Fig. 42.—*Nauphoeta silacea*, new species. Outline of cephalic limb of male (type). Brazzaville, Middle Congo, French Equatorial Africa. (Greatly enlarged.)

Fig. 43.—*Nauphoeta idonea*, new species. Dorsal view of male (type). Diego Suarez, Madagascar. (× 2.)

Fig. 44.—*Nauphoeta flexivitta* (Walker). Pronotum of male, showing recessive extreme of pattern. Leverville, Belgian Congo. (× 2.)

Fig. 45.—*Nauphoeta flexivitta* (Walker). Pronotum of male, showing intensive extreme of pattern. Kisantu, Belgian Congo. (× 2.)

Fig. 46.—*Agis peltatus*, new species. Dorsal view of pronotum of female (allotype). Mayumbe, Belgian Congo. (× 4.)

Fig. 47.—*Agis peltatus*, new species. Lateral view of pronotum of female (allotype). Mayumbe, Belgian Congo. (× 4.)

Fig. 48.—*Agis duchailluі*, new species. Cephalic view of head of male (type). San Benito River, Spanish Guinea. (Greatly enlarged.)

Fig. 49.—*Agis fictor*, new species. Cephalic view of head of male (type). Congo da Lemba, Lower Congo District, Belgian Congo. (Greatly enlarged.)

Fig. 50.—*Pseudoglomeris* (*Fanoblatta*) *oniscina* (Gerstaecker). Portion of dorsum of thoracic segments of female. N'Kogo, Ogowe, Gaboon. (× 3.)

Fig. 51.—*Pseudoglomeris* (*Fanoblatta*) *tolypeutes*, new species. Portion of dorsum of thoracic segments of female. Ipamu, Kasai, Belgian Congo. (× 3.)

Fig. 52.—*Stilpnoblatta nugax*, new species. Dorsal outline of female (type). Forest region of Hollis, Adja-Ouéré and Ilimon, Dahomey. (× 3.)

Fig. 53.—*Stilpnoblatta nugax*, new species. Cephalic view of head of female (type). Forest region of Hollis, Adja-Ouéré and Ilimon, Dahomey. (Greatly enlarged.)

Fig. 54.—*Stilpnoblatta nugax*, new species. Lateral outline of angle of occiput of female (type). Forest region of Hollis, Adja-Ouéré and Ilimon, Dahomey. (Greatly enlarged.)

Fig. 55.—*Stilpnoblatta planiceps*, new species. Cephalic view of head of female (type). Carnot, Middle Congo, French Equatorial Africa. (Greatly enlarged.)

Fig. 56.—*Stilpnoblatta planiceps*, new species. Lateral outline of angle of occiput of female (type). Carnot, Middle Congo, French Equatorial Africa. (Greatly enlarged.)

Plate 11

Fig. 57.—*Agis duchailluі*, new species. Dorsal view of pronotum of male (type). San Benito River, Spanish Guinea. (× 7½.)

Fig. 58.—*Agis duchailluі*, new species. Lateral view of pronotum of male (type). San Benito River, Spanish Guinea. (× 7½.)

Fig. 59.—*Agis fictor*, new species. Dorsal view of pronotum of male (type). Congo da Lemba, Belgian Congo. (× 7½.)

Fig. 60.—*Agis fictor*, new species. Lateral view of pronotum of male (type). Congo da Lemba, Belgian Congo. (× 7½.)

Fig. 61.—*Agis peltatus*, new species. Dorsal view of pronotum of male (type). Mayumbe, Belgian Congo. (× 6.)

Fig. 62.—*Agis peltatus*, new species. Lateral view of pronotum of male (type). Mayumbe, Belgian Congo. (× 6.)

Fig. 63.—*Agis pusillus*, new species. Dorsal view of pronotum of male (type). Brazzaville, Middle Congo, French Equatorial Africa. (× 7½.)

Fig. 64.—*Agis pusillus*, new species. Lateral view of pronotum of male (type). Brazzaville, Middle Congo, French Equatorial Africa. (× 7½.)

ZOOLOGICAL RESULTS OF THE THIRD DE SCHAUENSEE SIAMESE EXPEDITION PART VIII, — FISHES OBTAINED IN 1936

BY HENRY W FOWLER

The collection of fishes reported upon in the present paper was obtained in Siam in 1936, and is the most extensive of the several received by the Academy from Mr Rodolphe M de Schauensee[1] It comprises over 8200 specimens representing 351 species of which more than sixty (marked by an asterisk) were not included in his previous collections, not to mention the fifty-three which appear to be new to science together with twelve new genera or subgenera All of the new forms are figured as well as selected series of certain species which exhibit interesting color variations

It is hoped that the descriptions, figures and notes here presented will furnish a satisfactory basis upon which to build further studies The Academy is again grateful to Mr de Schauensee for this elaborate gift to its museum

DISTRIBUTION OF FRESH-WATER SPECIES

Krempf and Chevey 1935 have discussed the geological aspects in the relationship between the Continental Shelf of Indo-China and the East Indies They have also supplemented their work with a tabulation of Indo-China fresh-water fishes and their extralimital distribution In view of recent work carried on in Siam the common origin of its fish fauna with the East Indies is still more revealed, and may best be gathered from the list given below Though many of these species are incompletely studied, or not satisfactorily compared, they clearly emphasize a very close affiliation of Siam with the East Indian fauna

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[1] My previous reports are as follows

Zoological Results of the Third DeSchauensee Siamese Expedition, Part I, Fishes Proc Acad. Nat Sci Phila., vol 86, 1934 (April 30), pp 67 to 163, figures 1 to 129, pl 12, Part V, Additional Fishes, op cit, vol 86, 1934 (June 25), pp 335 to 352, figures 1 to 13, Part VI, Fishes obtained in 1934, op cit., vol 87, 1935 (June 24), pp 89 to 163, figures 1 to 132, Part VII, Fishes obtained in 1935, op cit., vol 87, 1935 (January 14, 1936), pp. 509 to 513, figures 1 to 7

In part VI, p 163, figure 27 is soiled with a small black spot on the adipose fin and the back, and figure 28 with a black spot on the first dorsal

In part VII, p. 509 for "Laun We" and "Loi Weve" read Loi Mwe, and for "Mong Lon" read Mong Lin, p. 510 for "Ching Sen" read Chieng Sen, and for "Ming Pek" read Meng Pek, p. 513 for "Meng Lin" read Mong Lin, and for "Loisande" read Lo, Mwe

	Siam	East Indies	Burma	India	China
Notopterus notopterus	×	×	×	×	
" *chitala*	×	×	×	×	
Anodontostoma chacunda	×	×	×	×	×
Nematalosa nasus	×	×	×	×	×
Corica soborna	×			×	
Monopterus albus	×	×	×		×
Synbranchus bengalensis	×	×		×	
Muraena australis	×	×	×	×	
Clarias batrachus	×	×	×	×	
" *meladerma*	×	×			
" *teysmanni*	×	×		×	
Saccobranchus fossilis	×		×	×	
Wallago attu	×	×	×	×	
Ompok bimaculatus	×	×	×	×	
Pangasius pangasius	×	×	×	×	
Bagarius bagarius	×	×	×	×	
Glyptothorax dorsalis	×		×		
Tachysurus caelatus	×	×		×	
" *gagora*	×		×	×	
" *maculatus*	×	×			×
" *sagor*	×	×		×	
" *thalassinus*	×	×		×	
" *venosus*	×	×	×	×	
Osteogeneiosus militaris	×	×		×	
Batrachocephalus mino	×	×	×	×	
Mystus cavasius	×		×	×	
" *gulio*	×	×	×	×	
" *tengara*	×			×	
" *vittatus*	×		×	×	
Amblyceps mangois	×		×	×	
Homaloptera modesta	×		×		
Nemacheilus beavani	×			×	
" *multifasciatus*	×			×	
Acanthopsis choirorhynchos	×	×		×	
Botia berdmorei	×		×		
Laubuca laubuca	×	×	×	×	
Rasbora argyrotaenia	×	×		×	
" *rasbora*	×		×	×	
Esomus altus	×		×		
" *danrica*	×		×	×	
Danio aequipinnatus	×		×		
" *albolineata*	×		×		
" *malabarica*	×		×		
Dangila berdmorei	×		×		
" *burmanica*	×		×		
Catla catla	×		×	×	
Labeobarbus stracheyi	×		×	×	
Cyclocheilichthys apogon	×	×	×		
Lissochilus dukai	×	×		×	

	Siam	East Indies	Burma	India	China
Varicorhinus dyocheilus	×			×	×
Barbus sarana	×		×	×	
Barilius bola	×		×	×	
" *guttatus*	×		×		
Panchax panchax	×	×	×	×	
Zenarchopterus amblyurus	×	×		×	×
" *dispar*	×	×		×	
" *ectuntio*	×		×	×	×
Mugil dussumieri	×	×		×	
" *oligolepis*	×	×		×	
" *speigleri*	×	×		×	
" *vaigiensis*	×	×		×	×
Rhynchobdella aculeata	×	×	×	×	
Mastacembelus argus	×				×
" *armatus*	×		×	×	×
Anabas testudineus	×	×	×	×	×
Trichopodus trichopterus	×	×	×		
Trichopsis vittatus	×	×		×	
Osphronemus goramy	×	×			×
Channa gachua	×	×		×	×
" *lucius*	×	×			×
" *marulius*	×		×	×	×
" *micropeltes*	×	×		×	
" *striata*	×	×		×	×
Chanda ranga	×		×	×	
" *baculis*	×			×	
Ambassis safgha	×	×		×	
" *gymnocephalus*	×	×		×	×
" *miops*	×	×		×	
" *thomassi*	×		×	×	
" *urotaenia*	×	×		×	
Lates calcarifer	×	×	×	×	×
Datnioides pollota	×	×		×	
Nandus nandus	×		×	×	
" *nebulosus*	×			×	
Pristolepis fasciatus	×	×	×		
Toxotes chatareus	×	×	×	×	
" *jaculator*	×	×		×	×
" *microlepis*	×	×	×		
Scatophagus argus	×	×		×	×
Bostrichthys sinensis	×	×			×
Butis butis	×	×		×	
Glossogobius giuris	×	×	×	×	

Siamese–East Indian Species

Scleropages formosus
Lycothrissa crocodilus
Coilia macrognathos
Clarias macrocephalus, nieuhofi
Wallago miostoma
Belodontichthys dinema
Kryptopterus apogon, bicirrhis, cryptopterus, hexapterus, limpok, micronema
Hemisilurus scleronema
Silurichthys phaiosoma
Silurodes hypophthalmus
Pangasius macronema, micronema, nasutus, polyuranodon
Glyptothorax major, platypogonoides
Tachysurus argyropleuron, leiotetocephalus, macronotacanthus, melanochir, stormii, truncatus
Ketengus typus
Hemipimelodus borneensis
Mystus micracanthus, nemurus, nigriceps, planiceps, wolffii, wyckii
Bagroides macracanthus, macropterus, melapterus
Leiocassis poecilopterus
Akysis macronema
Homaloptera zollingeri
Nemacheilus fasciatus
Acanthophthalmus anguillaris, kuhli
Botia hymenophysa
Lepidocephalus hasselti
Oxygaster oxygastroides
Macrochirichthys macrochirus
Rasbora einthovenii, heteromorpha, lateristriata, trilineata
Luciosoma setigerum
Leptobarbus hoevenii, melanotaenia
Mystacoleucus marginatus
Dangila kuhlii, sumatrana
Thynnichthys thynnoides
Osteochilus borneensis, hasseltii, schlegelii vittata, waandersii
Osteochilus melanopleura
Hampala macrolepidota
Labeobarbus douronensis, soro, tambroides
Cyclocheilichthys armatus, enoplus, heteronema, repasson
Lissochilus sumatranus
Barbus bantamensis, binotatus, bramoides, brevis, bulu, javanicus, lateristriga, orphoides, schwanefeldii, sumatranus
Balantiocheilus melanopterus
Barbichthys laevis
Morulius chrysophekadion
Epalzeorhynchus kalopterus
Crossocheilus oblongus
Dermogenys pusillus
Channa melasoma
Helostoma temmincki
Trichopodus leeri
Betta taeniata
Acanthoperca wolffi
Ambassis buruensis, gymnocephalus
Datnioides microlepis

DESCRIPTION OF SPECIES

ORECTOLOBIDAE

Hemiscyllium griseum (Müller and Henle)

One, 168 mm., Rayong.

GALEORHINIDAE

Scoliodon walbeehmi (Bleeker)

One, 223 mm., Bangkok.

DASYATIDAE

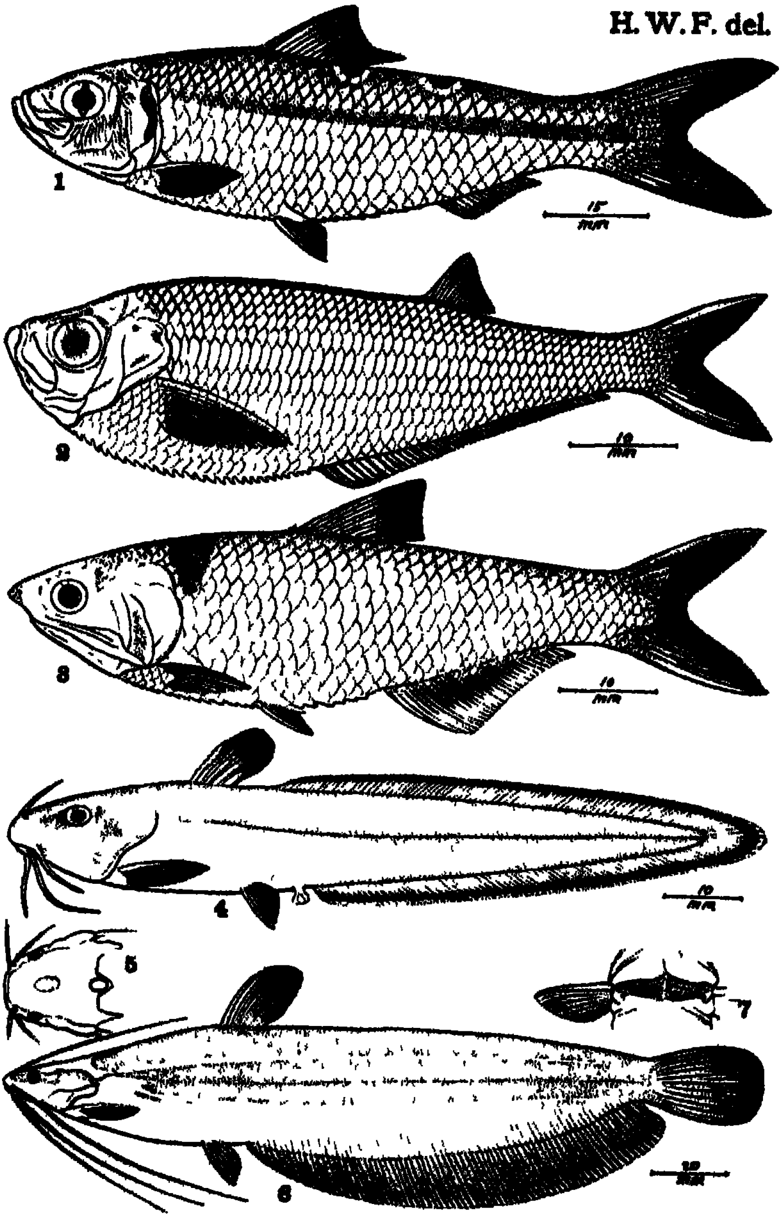
Dasyatis imbricatus (Schneider)

One, disk length 57 mm., disk width 67 mm., tail 93 mm., Paknam.

ELOPIDAE

Megalops cyprinoides (Broussonet) *

One, 180 mm., Bangkok.



1 *Harengula dispilonotus* 2. *Opisthopterus indicus*
3 *Thrissocles kammalensis* 4 *Plotosus anguillaris*
5 to 7 *Clarisilurus kemratensis*

NOTOPTERIDAE

Notopterus notopterus (Pallas)

Fourteen, 80 to 175 mm , Bangkok, one, 88 mm , Paknam, nine, 84 to 116 mm , Tachin

CHIROCENTRIDAE

Chirocentrus dorab (Forskål) *

One, 253 mm , Paknam Depth 7

Chirocentrus hypselosoma Bleeker *

Depth 6¼ to 6⅗, head 4⅘ to 5, width 3⅘ to 4 Snout 3⅕ to 3½ in head from snout tip, eye 4½ to 5, 1¼ to 1½ in snout, greater than interorbital, maxillary reaches ⅘ to ¾ in eye, expansion 1⅔, length 2⅕ to 2⅙ in total head length, lower teeth greatly longer than upper, and all diminishing greatly posteriorly in jaws, interorbital 5½ to 6⅕ in head from snout tip Gill rakers 3 + 17, slender, 1⅘ in eye, gill filaments ⅘ of gill rakers

Scales all fallen, even pockets but little defined Broad branch of venules, radiating down from behind eye, covers cheek

D II, 13 or II, 14, first branched ray 3½ ? in total head length, A III, 30, I, first branched ray 3¼ ? , caudal equals head, lower lobe slightly longer, least depth of caudal peduncle 3 to 3⅓ in total head length, pectoral 1⅓ to 1⅝, rays II, 12, ventral rays I, 5, fin 5⅘ to 6 in total head length

Back and upper surface of head gray, darker along upper ridge Sides and lower surfaces pale, evidently silvery white in life Iris gray, evidently pale in life Inconspicuous black dots scattered on lower part of tail above base of anal Fins all rather conspicuously or contrasted pale, very light brownish or whitish, only hind border of caudal slightly gray End of mandible dark gray and lower border sprinkled with dark dots Area of adipose eyelids on head pale

Three, 154 to 158 mm , Tachin

DUSSUMIERIIDAE

Dussumieria acuta Valenciennes

Four, 112 to 137 mm , Paknam, five, 50 to 75 mm , Tachin

CLUPEIDAE

Kowala thoricata Valenciennes

One, 81 mm , Bangkok, 98 examples, 69 to 93 mm , Tachin

Sardinella jussieu (Lacépède) *

Six, 138 to 144 mm , Bangkok, five, 88 to 107 mm , Paknam, five, 98 to 123 mm , Rayong, one, 132 mm , Tachin Gill-rakers 30 + 50

Sardinella melanura (Cuvier) *

Three, 138 to 143 mm , Bangkok Lower gill rakers 48 Black tip to each caudal lobe distinct but not greatly contrasted

Harengula brachysoma (Bleeker)

Two, 138 to 143 mm , Bangkok, two, 125 to 130 mm , Paknam, two, 118 to 132 mm , Tachin

Harengula dispilonotus Bleeker Figure 1

Four, 85 to 103 mm , Ravong

Corica laciniata Fowler

One, 58 mm , Bangkok, three, 40 to 60 mm , Paknam, 73 specimens, 55 to 66 mm , Tachin Scales 30 + 3

Clupeoides exilis Fowler

Twenty-two, 54 to 70 mm , Bangkok, eight, 45 to 60 mm , Tachin All with caudal pale yellowish, with dark gray border and sometimes end of each lobe rather broadly blackish

Ilisha indica (Swainson)

Twenty, 68 to 130 mm , Tachin Depth 2⅝ to 3⅛ A rays iii, 32 to iii, 36 In the younger stages usually more deeply bodied

Opisthopterus indicus (Swainson) Figure 2 (Paknam)

One, 170 mm , Bangkok, two, 80 to 96 mm , Paknam

ENGRAULIDAE

Anchoviella commersonii (Lacépède) *

One, 58 mm , Bangkok, two, 56 to 68 mm , Paknam, 77 specimens, 55 to 88 mm , Tachin Gill rakers 24 + 25 Scutes between paired fins 6 Scales 33 + 3 in lateral series A ii, 17 or 18

Anchoviella indica (Van Hasselt) *

One, 107 mm , Bangkok, two, 122 to 129 mm , Paknam

Thrissocles kammalensis (Bleeker) * Figure 3

Depth 3⅜ to 3⅝, head 3½ to 3⅜, width 3 to 3¼ Snout 4 to 4⅓ in head, as seen from above end narrowly compressed, eye 4⅘ to 5, 1 1/10 to 1¼ in snout, 1⅛ to 1⅓ in interorbital, maxillary reaches nearly to, or quite to hind edge of gill opening, length 1⅛ to 1¼ in total length of head, teeth very fine, minute; interorbital 4½ to 4⅔, elevated convexly, top of head with median keel forward to end of snout, quite cavernous Gill rakers 27 + 30, finely lanceolate, ⅘ of eye, gill filaments ½ of gill rakers

Scales 25 to 30 + 4 or 5 in lateral series, 10 or 11 transversely above anal origin, 15 or 16 predorsal Pectoral and ventral each with long axillary scale Caudal base scaly, without alar scales Anal base with row of rather large scales Abdominal scutes 15 + 8 to 10 Scales rather firmly adherent, with reticulate lines, of which 4 to 6 principal ones more or less radiate from center of scale basally, apically reticulations smaller and more numerous

D. i–ii, 10, i, third simple ray 1⅓ to 1½ in head, A. ii or iii, 28, i to 30, i, first branched ray 1⅘ to 2, caudal equals head, deeply forked, least depth of caudal peduncle 2⅓ to 3, pectoral 1⅔ to 1⅘, rays i, 10, ventral rays i, 6, fin 2⅗ to 2¾ in head

Largely pale to whitish, with more or less silvery sheen Back slightly darker, with dark dots A saddle-like dark gray blotch on front of predorsal or above hind part of head, triangular as seen in profile. Iris whitish Fins all pale, more or less whitish, end of dorsal and most of upper caudal lobe terminally more or less dark gray. Some dark dots along caudal rays basally

Three, 60 to 78 mm , Paknam

Thrissocles hamiltonii (Gray)

One, 180 mm., Tachin

Thrissocles mystax (Schneider)

One, 52 mm , Paknam, three, 109 to 138 mm , Tachin Maxillary nearly reaches ventral A ii, 32, i, to ii, 35, i

Thrissocles setirostris (Broussonet) *

Two, 51 to 109 mm , Paknam

Lycothrissa crocodilus (Bleeker)

One, 77 mm , Tachin

Setipinna taty (Valenciennes)

Two, 143 to 167 mm , Bangkok

Setipinna melanochir (Bleeker) *

Depth 3⅗, head 5⅓, width 2⅖ Snout 6 in head; eye 4½, greater than snout, 1⅓ in interorbital, maxillary reaches hind edge of preopercle, expansion 1⅓ in eye, length 1⅓ in head, interorbital 4⅓, convex, with median ridge to occiput Branchiostegal membrane forms short, free fold across isthmus Gill rakers 8 + 10, equal eye, gill filaments ⅗ of gill rakers

Scales 42 + 3 in lateral series, 15 transversely between dorsal and anal origins, 21 predorsal Scales very caducous Abdominal scutes 10 + 9

D i–ii, 9, i, first branched ray equals head, A ii, 45, i, first branched ray 1⅓, caudal 4 in rest of fish, deeply forked, least depth of caudal peduncle 2⅓ in head, pectoral 1, rays i, 13, ventral rays i, 5, fin 2¼ in head

Back and upper surface of head dark brown, sides and below pale to whitish, with bright silvery white reflections Iris silvery white, jaws whitish Dorsal and caudal pale brownish with grayish terminally Anal and ventrals whitish, pectorals black

One, 135 mm , Tachin

Coilia macrognathos Bleeker

Three, 145 to 173 mm , Bangkok, 28 specimens, 73 to 209 mm , Tachin. In small specimens the maxillary reaches only to the pectoral origin, but in the largest well beyond. Abdominal scutes 13 + 23 A. 77. Pectoral filaments 6.

SYNODONTIDAE

Saurida tumbil (Bloch) *

One, 200 mm, Paknam Scales 53 + 5 in lateral line, 5 above D. II, 9, I Pectoral 2 in head

PLOTOSIDAE

Plotosus anguillaris (Bloch) * Figure 4

Eight, 103 to 145 mm, Paknam Nasal barbels reach middle of eye

CLARIIDAE

Clarias batrachus Linnaeus

Four, 72 to 124 mm, Me Poon; one, 103 mm, Pitsanulok The last specimen much paler than the others, or quite light brown

SILURIDAE

Wallago attu (Schneider)

One, 175 mm, Tachin

CLARISILURUS, new genus

Body elongate, greatly compressed, less so forward, greatly so posteriorly Head small, broadly depressed Snout short, broad, obtuse, muzzle shallow Eye small, well advanced in head, lateral, margins free all around Mouth terminal, broad, gape very short or barely reaches ⅛ to eye Barbels 8, well developed, all greatly longer than head Teeth minute, in jaws and on vomer Top of head broadly convex, with frontal and occipital fontanels well developed Gill-opening deep, membranes cleft half way to isthmus, each side forming broad flap over broad bony thorax, or conceals about half its anterior area Humeral extension short curved ledge Gill rakers numerous, lanceolate, close set Skin smooth Top of head and bony thorax rugose striate, not covered with skin Lateral line distinct, complete Single small dorsal fin, inserted behind ventrals No adipose fin Caudal small, rounded Anal with long base, much greater than rest of fish, free from caudal Pectoral small, low, with strong spine nearly long as fin Ventral usually well behind end of pectoral, little smaller Type *Clarisilurus kemratensis*, new species

A genus defined only as superficially suggestive of *Clarias* in its head depressed and with somewhat similar fontanels, the body greatly compressed, and the small dorsal advanced

(*Clarias* + *Silurus*, the type genus)

Clarisilurus kemratensis, new species Figures 5 (head above), 6 (lateral view), 7 (thorax)

Depth 5⅓ to 6⅛, head 6⅓ to 7, width 1⅛ to slightly greater than head length Snout 3¼ to 3⅞ in head, eye 6⅓ to 7½, 1⅞ to 2 in snout, 4 to 4⅓ in interorbital, mouth width 2¾ to 3½ in head, jaws about even, or lower scarcely extended, nasal barbels reach ⅞ to, or to dorsal origin, maxillary pair reaches bases of fifth to eleventh anal rays, outer mental pair reaches vent or to base of eighth anal ray, inner mental pair reaches ventral fin origin or about base of fifth anal ray, teeth minutely and evenly villiform in jaws, as rather broad band in each, similar band on each side of vomer, narrower than bands of upper jaws, parallel, interorbital 1⅝ to 1⅞ in head, broadly convex, frontal fontanel 1½ times eye, invades most of interorbital space, occipital fontanel long as eye, largely in short triangular occipital extension Gill rakers 6 + 24, slender, equal gill filaments or 1⅓ in eye

Skin smooth, firm Lateral line axial, as narrow ill defined canal on trunk and small, wide set pores on tail Anal papilla sometimes well developed, conic, little less than eye

D i, 5, first ray scarcely spinous, very flexible like branched rays, fin length 1 to 1⅜ in head, A 75 to 84, fin height medially 1½ to 1⅝, caudal length 7 to 8 in rest of fish, caudal peduncle depth 2⅗ to 3½ in head, pectoral 1⅜ to 1⅝, rays I, 8, spine long as fin, with 10 or 11 antrorse serrae along outer edge, 12 or 13 along inner edge, [illegible] small specimens fin reaches 1⅓ to ventral, half way in larger, ventral rays [illegible], 5, fin 1⅘ to 1¾ in head

Dark gray brown generally, paler or light gray on under surface of head and belly Iris gray Two narrow, pale gray longitudinal bands, parallel on side of body, one above and other below lateral line, fading out behind. Fins and barbels blackish brown, especially in smaller specimens

A N S P , No 67, 880 Kemrat Length 210 mm Type Also Nos 67,881 to 67,883, same data, paratypes Length 143 to 160 mm

An interesting siluroid with dark gray coloration, contrasted with two narrow pale bands longitudinally on each side of the body

(Named for Kemrat, the type locality)

Belodontichthys dinema (Bleeker)

Two, 260 to 268 mm , Bangkok

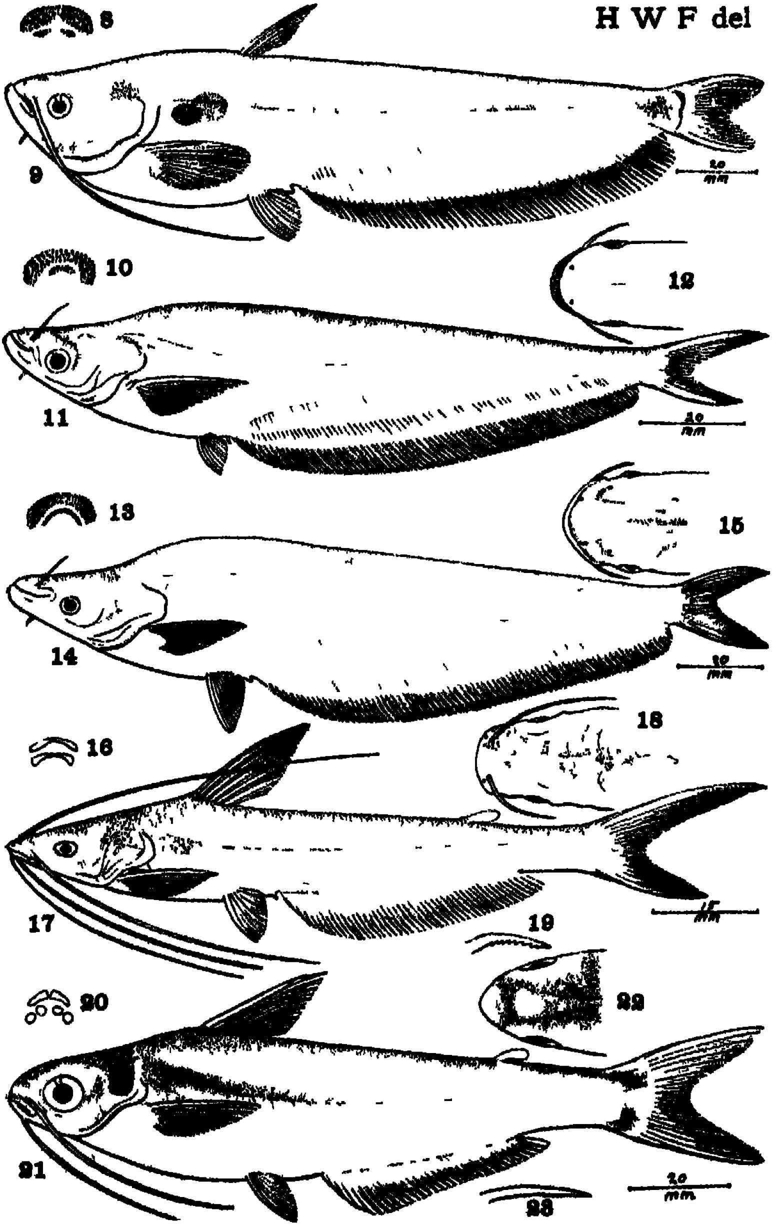
Ompok bimaculatus (Bloch) Figures 8 (upper and vomerine teeth) 9 (Kemrat)

Depth 4⅓ to 4⅝, head 4⅓ to 4¼, width 1⅝ to 1¾ Snout 3⅛ to 3¾ in head from snout tip, eye 5⅓ to 6⅓, 1½ to 2¼ in snout, 3 to 4¼ in interorbital, maxillary not quite reaching eye, length 3 to 4⅓ in head from snout tip, mouth width 1⅘ to 1⅞, mandible well protruded, teeth in jaws in broad bands of 4 or 5 series in irregular transverse count, depressible and larger inside, vomer with narrow small, slender, short band each side, much smaller than jaw teeth, long maxillary barbel reaches ventral or little beyond, and small mental barbel ⅘ of eye, interorbital 1⅔ to 2, convex Gill rakers 2 + 9, lanceolate, 1⅓ in gill filaments, equal eye

Skin smooth Lateral line complete, axial, conspicuous Anal papilla moderate, conic

D 4, fin 1⅔ to 1⅘ in total head length, A 58 to 61, last ray adnate by membrane with caudal, fin height 1⅞ to 2⅓, caudal 1⅜ to 1⅗, emarginate, pectoral 1⅛ to 1⅓, spine entire, firm, terminally flexible, rays I, 12, ventral i, 7, fin 2⅓ to 3 in total head length

Brown, scarcely paler below Iris grayish Barbels pale brownish Some examples with irregular darker brownish areas or blotches on head and body Dark gray rounded blotch at front of lateral line (above air-bladder)



8, 9. *Ompok bimaculatus* 10 to 12 *Kryptopterus deignani*
13 to 15. *Kryptopterus micronema* 16 to 19 *Nemasiluroides furcatus*
20 to 23 *Pangasius aequilabialis*

Diffuse dark gray blotch at caudal base and dark line transversely on caudal subbasally Vertical fins grayish terminally, especially anal and caudal. Paired fins pale

One, 193 mm , Pitsanulok, two, 127 to 130 mm., Bangkok, one, 187 mm, Kemrat

Kryptopterus bicirrhis (Valenciennes)

Twenty, 78 to 108 mm, Bangkok Maxillary barbel extends ⅓ in pectoral Pectoral spine long as head and fin longer In all pectoral with dusky dots and especially with blackish blotch at its lower margin.

Kryptopterus cryptopterus (Bleeker) *

One, 98 mm, Paknam No mandibular barbels, but in all other ways in agreement.

Seventeen, 65 to 137 mm, Bangkok Maxillary barbel reaches ⅔ in pectoral Mandibular barbel always distinct, though rudimentary Pectoral spine usually little longer than head, and fin much more so All pale, the pectoral always without any black on its lower half

Kryptopterus deignani, new species Figures 10 (upper and vomerine teeth), 11, 12 (head above)

Depth 5¼, head 4½, width 1¼ Snout 2 in head from snout tip, eye 5¾, 1¼ in snout, 2⅜ in interorbital, maxillary not quite reaching opposite front of eye, length 3⅛ in head from snout tip; mouth width 1$\frac{2}{10}$, mandible well protruded, maxillary barbel reaches hind edge of eye, minute mandibular barbel ⅓ of eye, teeth conic, slender, outer little smaller and 4 or 5 irregularly in transverse series, in jaws, similar narrower parallel band on vomer with smaller teeth, in about 3 transverse series, interorbital 2 in head, broadly convex, occipital fontanel long, narrow, reaches occipital extension beyond eye Gill rakers 6 + 12, finely or slenderly lanceolate, ⅓ of eye, gill filaments ¾ of gill rakers

Skin smooth Lateral line complete, axial, distinct

A. 81, fin height 2⅓ in total head, last ray joined basally to caudal by membrane, caudal 1⅓, lower lobe little shorter, fin well forked, depth of caudal peduncle 5, pectoral 1⅓, spine slender, entire, pungent, rays I, 14, ventral I, 8, fin 3 in total head, anal papilla small, short point

Pale grayish or brownish, scarcely lighter below On upper surface of head and along edge of back minute dark dots Iris grayish. Fins pale to more or less whitish, terminally grayish on anal posteriorly and dark gray on ends of caudal lobes Paired fins uniformly pale

A N S P, No 67,884 Me Poon, Siam Length 143 mm. Type

Only known from the type, differing from *Micronema typus* Bleeker, as shown by his figure, in larger or wider bands of teeth, besides a smaller eye. Bleeker mentions six specimens 137 to 326 mm. long, with the A. 86 to 93. *M deignani* shows but 81 anal rays.

(For Mr H E Deignan, an earnest student of Siamese ornithology, now of Chieng Mai)

Kryptopterus micronema (Bleeker) Figures 13 (upper and vomerine teeth), 14, 15 (head above)

Depth 5 to 5⅔, head 4⅛ to 4½, width 1⅞ to 2⅛. Snout 2⅞ to 3⅛ in head from snout tip, eye 6 to 7, 2⅓ to 2⅗ in snout, 2¼ to 4 in interorbital, maxillary reaches before but not to eye, length 3⅛ to 3⅓ in head from snout tip, mouth width 1⅗ to 1⅔, broadly flattened mandible well protruding, maxillary barbel reaches front eye edge or to hind eye edge, minute mandibular barbel ½ of eye, teeth slender, conic, pointed, forming broad bands in jaws of 5 irregular series, and much narrower inner parallel band of smaller teeth; interorbital 1⅞ to 2, broadly convex, occipital fontanel narrow, extends well in occipital extension Gill rakers 4 + 13, finely lanceolate, ⅓ of gill filaments or 1¼ in eye

Skin smooth Lateral line complete, axial, distinct

A 76 to 79, fin height 2⅗ to 3 in total head length, caudal 1½ to 1⅞, deeply forked, pointed lobes equal, depth of caudal peduncle 4⅓ to 7, pectoral 1¼ to 1⅗, rays I, 14, spine slender, pungent, entire, ventral rays I, 10, fin 2½ to 2⅗ in total head length, anal papilla small conic point

Light or pale brown or gray, scarcely paler on under surface of head and belly Upper surface of head and back sprinkled with brown to dark brown or gray dots Iris gray, evidently whitish in life Fins pale to whitish, inner fork of caudal dark gray to blackish, and anal fin on terminal part of fin posteriorly same Pectoral with dark to blackish dots Young often more contrasted with more numerous and extensive areas of dark dots

Eight, 105 to 188 mm , Bangkok

Agrees in having the anal united with the caudal by a basal membrane, and differs from *K deignani* in the greatly smaller eye

Kryptopterus hexapterus (Bleeker)

Two, 123 to 132 mm , Bangkok Maxillary barbel reaches ⅘ in pectoral, and mandibular barbel reaches pectoral origin No dorsal Pectoral fin ¼ greater than head, spine 1½ in total head length

PANGASIIDAE

NEMASILUROIDES, new genus

Body elongate, slender, strongly compressed, deepest about origin of first dorsal fin and but slightly tapering posteriorly Head small, depressed forward Muzzle broadly depressed or flattened both above and below Eye advanced, lateral, moderate, with free lids. Mouth terminal, broad Barbels as nasal, maxillary, inner and outer mental pairs, all very long and reaching back well behind head Teeth minute, in narrow bands in jaws and on vomer, none of palatines Long well developed frontal-occipital fontanel Gill rakers slender, lanceolate Gill membranes deeply cleft forward far as front of eye Skin smooth, top of head striate. Humeral extension moderate. Dorsal advanced, begins little behind end of humeral extension, its basal plate forming continuous bony bridge forward to occipital extension, fin nearly long as head, and with slender spine. Adipose fin small, much nearer caudal than dorsal and over last fourth of anal Anal long and low, nearly half length of fish without caudal Caudal deeply forked, lobes sharply or slenderly pointed Caudal peduncle compressed, constricted, and rather long Pectoral small, low, with strong compressed spine Ventral small, its origin close behind base of first dorsal. Type *Nemasiluroides furcatus*, new species

Related to *Pseudeutropius* Bleeker, which is here restricted to its genotype *Eutropius brachypopterus* Bleeker, in the smaller anal fin with but 28 rays, shorter barbels, large eye and less sharply forked caudal fin With *Nemasiluroides* I also include *Pseudeutropius moolenburghae* Weber and Beaufort, with only 40 anal rays, also shown to have shorter dorsal and pectoral fins

(Νῆμα thread + *Siluroides*, with reference to the long, prominent barbels)

Nemasiluroides furcatus, new species Figures 16 (upper and vomerine teeth), 17 (lateral view), 18 (head above), 19 (right pectoral spine)

Depth 5 to 5¼, head 4 to 4⅛, width 1½ to 1⅗ Snout 3⅓ to 3⅝ in head, eye 5¼ to 6, 2 to 2⅛ in snout, 2⅝ to 3¼ in interorbital, maxillary reaches ½ to ⅗ to eye, length 4¼ to 4⅘ in head, mouth width 2⅗ to 3, jaws even, nasal barbel reaches bases of twentieth to twenty-fifth anal ray, maxillary barbel to tenth to fifteenth anal ray base, outer mental to anal origin or to fifth anal ray base, inner mental barbel to anal origin or to tenth anal ray base, teeth minutely villiform, in narrow bands in jaws and broader continuous band, parallel, across vomer, constricted or narrower anteriorly or medially, interorbital 1⅞ to 2⅛ in head, long and moderately wide frontal-occipital fontanel reaching base of occipital extension Gill rakers 10 + 28, slenderly lanceolate, length 1⅛ in eye or twice gill filaments

Skin smooth Lateral line complete, axial, distinct, pores minute, close set Humeral extension rather short or about ⅘ pectoral fin, its lower edge concave

D I, 5, firm sharp pointed spine with front edge entire and hind edge with about 18 low, inconspicuous, small antrorse serrae, first ray 1⅛ to 1⅒ in head, adipose fin 3⅗ to 4, A 44 to 49, fin height 2¼ to 2½, least depth of caudal peduncle 3 to 3⅗, caudal 2⅞ to 3⅛ in rest of fish, deeply forked and lower lobe usually much shorter than upper, pectoral 1⅔ to 1⅘ in head, spine slender, strong, compressed, outer edge usually with basal row of granules and inner edge with 12 or 13 strong antrorse serrae, ventral 1⅞ to 2⅗, anal papilla short fleshy point

Pale brownish to grayish or whitish, darker above or with upper surface of head and back sprinkled with dark dots Iris gray, apparently whitish in life Barbels brown Fins all pale, dorsal and caudal pale orange, grayish terminally Paired fins pale

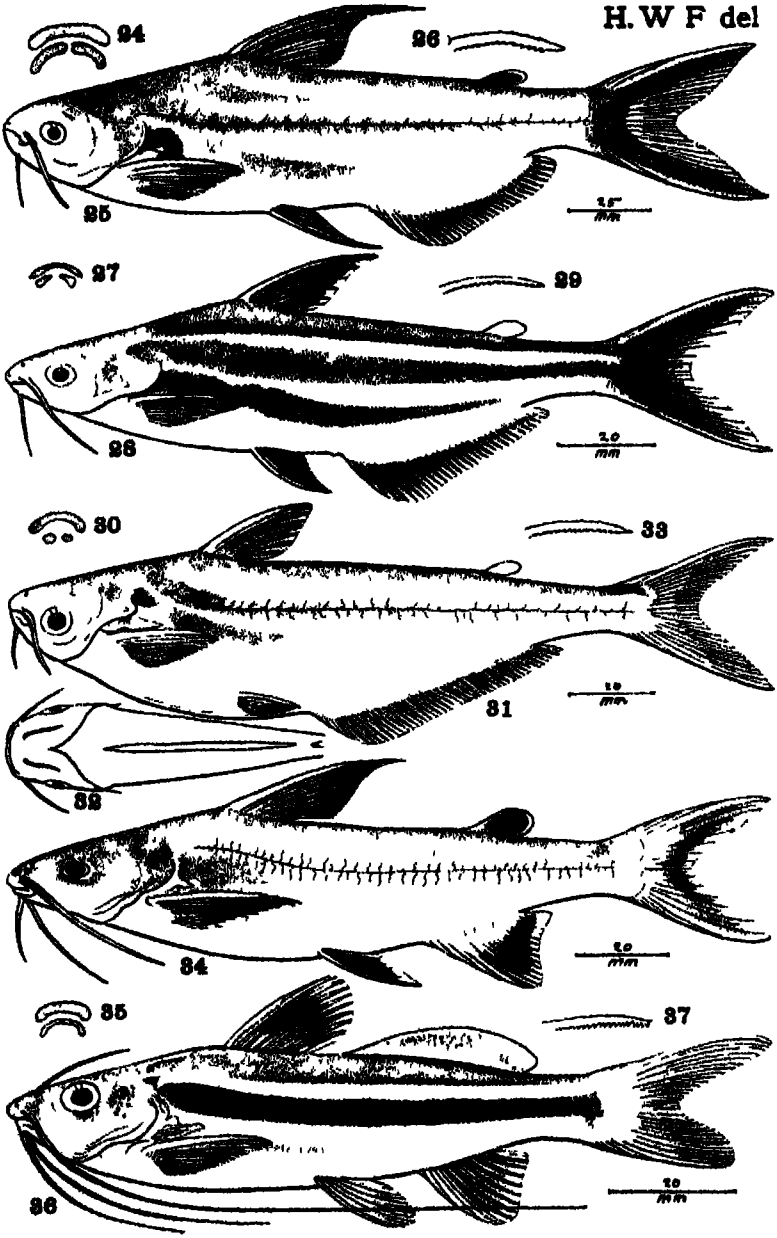
A N S P , No 67,893 Bangkok, Siam Length 115 mm. Type Also Nos 67,894 to 67,896, same data, paratypes. Length 103 to 107 mm.

The specific distinctions are carried in those of the genus.

(*Furcatus* forked, with reference to the caudal fin)

Pangasius siamensis Steindachner

Twenty, 63 to 165 mm , Bangkok, one, 151 mm., Me Poon. Lower jaw well included within upper Maxillary barbel reaches end of pectoral spine, mandibular barbel reaches ½ in pectoral fin. A iv, 28, i to iv, 30, i



24 to 26 *Pangasius burgini* 27 to 29 *Pangasius sutchi*
30 to 33 *Pteropangasius cultratus* 34 *Hemipimelodus atripinnis*
35 to 37 *Mystus atrifasciatus*

Steindachner describes this species from the Menam River at Bangkok. Depth over 4; head 5¼ to 5⅓ Eye 3⅓ to 3⅝ in head, maxillary barbel 1½ times head or reaches middle of pectoral. D I, 7; A 35 or 36, pectoral I, 12 Gray above, white below. Pale lateral band Fins yellowish Oval dark spot between gill openings Length 260 mm

Pangasius aequilabialis, new species Figures 20 (upper and vomerine teeth), 21 (lateral view), 22 (top of head), 23 (right pectoral spine)

Depth 3¾ to 4⅛, head 4 to 4¼, width 1¼ to 1½ Snout 3¾ to 4 in head, eye 3½ to 4, slightly greater than eye to subequal with eye, 1¾ to 2⅛ in interorbital, maxillary reaches ⅞ or to front eye edge, length 3½ to 4⅛ in head; mouth width 2⅘ to 3⅓, jaws even in front, maxillary barbel reaches middle of pectoral or to ventral, mental barbel reaches ⅓ to ⅔ in depressed pectoral, teeth minutely villiform, in rather small bands in jaws and small rounded patch each side of vomer, and one on each palatine, interorbital 2 to 2⅛, broadly convex, bony bridge from occipital extension to dorsal plate complete Gill rakers 11 + 28, slender, lanceolate, 1⅘ in eye, gill filaments ¾ of gill rakers

Upper surface of head covered with thin, smooth skin, also on predorsal bridge Humeral extension ⅜ of depressed pectoral Lateral line complete, distinct, axial, with few short branches, irregular, both below and above on costal region

D I, 6 or 7, strong pungent spine with front edge entire and along hind edge 17 to 21 antrorse serrae, fin length ⅞ of head to 1⅛ times head, adipose fin lobate, length 3⅜ to 4 in head, A iv, 29, i or iv, 30 i, fin height anteriorly 2⅛ to 2⅓ in head, least depth of caudal peduncle 2¼ to 2⅓; caudal 4 to 4¼ in rest of fish, deeply emarginate behind, pointed, narrowly triangular lobes equal, pectoral 1⅛ to 1⅓ in head, rays I, 10, strong compressed spine with outer edge finely serrated or with only few weak antrorse serrae terminally in younger specimens, inner edge with 18 to 22 antrorse serrae, ventral 2 to 2½ in head, rays i, 6

Largely silvery gray or whitish, back above and elongate area along lateral line over costal region dark gray or gray brown Lower side of head, inclusive of adipose like tissue around eye pale to whitish, also lips and diffuse area in middle of interorbital Smaller examples also show a dark parallel streak on lower side of costal region extended back variously from humeral region Iris white, also barbels. Usually diffuse gray black blotch at origin of dorsal Rounded dark blotch on opercle nearly size of eye Fins pale to whitish or varied yellow or cream colored shades basally, inner edge of caudal grayish

A N S.P, No 67,897 Bangkok, Siam Length 138 mm. Type. Also Nos 67,898 to 67,900 same data, paratypes Length 98 to 115 mm.

Greatly like *Pangasius siamensis* but the physiognomy different as the jaws are nearly or quite equal Two patches of teeth on the vomer as well as on the palatines.

(*Aequus* equal + *labrum* lip, with reference to the lips in profile)

Pangasius burgini, new species Figures 24 (upper and vomerine teeth), 25 (lateral view), 26 (right pectoral spine)

Depth 3⅗; head 4¼, width 1⅛ Snout 4 in head, eye 5⅔, 1½ in snout (in profile), 4 in interorbital, maxillary extends ⅔ in snout (in profile to eye), length 3 in head, mouth width 1⅘, closed jaws even in front, short maxillary barbel reaches ⅘ to pectoral origin, and mandibular barbel only reaches half so far; teeth fine, sharp pointed, in rather broad band in jaws, and pair of curved bands or only separated medially so one each side, on vomer; interorbital 1⅘ in head, broadly convex, occipital fontanel well marked, begins in interorbital space and nearly reaches base of occipital extension, with which nearly subequal in length Gill rakers 5 + 7, short lanceolate points, which 2 in gill filaments, latter 1½ in eye

Skin smooth, rather firmly coriaceous Bony dorsal bridge complete, occipital extension ⅔ its extent Humeral extension half of depressed pectoral. Lateral line complete, axial along side of body, with short branches above and below its entire extent

D I, 7, spine about 1⅛ in head, its front edge with sharp keel which only with feeble minute points below or basally, hind edge with 25 antrorse serrae, gradually larger terminally, entire fin length slightly less than predorsal length, adipose fin 2⅘ in head, A VI, 27, I, fin height anteriorly 2, least depth of caudal peduncle 2½, caudal 3$\frac{1}{10}$ in rest of fish, deeply forked, lower lobe little longer, pectoral I, 9, strong spine compressed, little arched outer edge with sharp keel marked by few feeble points, inner edge with 17 strong antrorse serrae, fin 1⅛ in head, ventral 1⅛, rays I, 5, anal papilla very small, inconspicuous

Back and upper surfaces dark gray, paler to whitish on sides and under surfaces Lips and sides of head pale to whitish Iris gray Barbels pale Gray black post-humeral blotch over twice size of eye Dorsal gray, upper hind margin whitish Adipose fin dark gray, with narrow whitish edge Caudal whitish, with broad gray black median band on each lobe and connected basally Other fins all pale to whitish

A.N.S.P., No 67,901 Bangkok, Siam Length 232 mm Type

Only the type known The species is related to *Pangasius sutchi* and *P taeniura*, but differs from both in coloration, and especially in the presence of the gray black large post-humeral blotch.

(For the late Dr Herman Burgin, of Philadelphia, to whom I am indebted for numerous local fishes)

Pangasius sutchi, new species Figures 27 (vomerine teeth), 28 (lateral view), 29 (right pectoral spine)

Depth 4 to 4½, head 3¾ to 4, width 1⅗ to 1⅘ Snout 4⅓ to 4⅔ in head, eye 4½ to 5⅓, 1⅓ to 1½ in snout, 3¼ to 3½ in interorbital, maxillary reaches ⅘ in snout, length 4¼ to 4⅓ in head, mouth width 2½ to 2⅘, lower jaw slightly shorter than upper; maxillary barbel reaches ⅘ to, or to pectoral origin, mandibular reaches opposite middle of eye or ¾ to pectoral origin, teeth minutely villiform, feeble, in narrow band in each jaw and 2 parallel bands as one section each side of vomer, expanded little posteriorly; interorbital 1⅘ to 1⅗ in head, broadly convex; frontal fontanel moderate, extends from middle of interorbital to base of occipital extension, which forms complete bony bridge with predorsal buckler Gill rakers 4 + 16, lanceolate, ½ of gill filaments, which 1¼ in eye

Skin smooth Occipital extension reaches 1⅗ in predorsal or to dorsal buckler. Humeral extension reaches 2½ in depressed pectoral, covered with thin skin Lateral line complete, axial, with numerous short branchlets along its entire course both above and below

D I, 6, spine slender, pungent, front edge entire, with 9 to 12 feeble small antrorse serrae along inner edge, fin length 1$\frac{1}{10}$ to 1⅓ in head, adipose fin length 3¼ to 3½, A iv, 30 to iv, 32, front fin height 2 to 2⅓, least depth of caudal peduncle 3 to 3⅛, caudal 3½ to 3¾ in rest of fish, deeply forked, slender lobes pointed and equal or nearly so, pectoral I, 8, strong pungent spine with front edge entire, hind edge with 14 or 15 antrorse serrae along inner edge, ventral rays i, 8, fin 1¾ in head, anal papilla short, convex

Above dark to blackish gray, with pale or whitish longitudinal band parallel and close along dark band of lateral line, and another from below front or lateral line back to caudal peduncle, under surface of body whitish Iris gray Lips gray, chin below sprinkled with dark dots Maxillary barbels with brownish edges and mandibular all pale or white Dorsal gray black, basally more grayish and lower hind edge whitish Adipose fin grayish Caudal dark gray or gray black, edges pale or whitish all around Anal largely white, with gray black longitudinal band, broad anteriorly and narrowing posteriorly, in smaller specimens only as dark shade anteriorly, most of fin whitish Paired fins largely gray black, paler marginally or basally, and ventrals largely whitish in small specimens

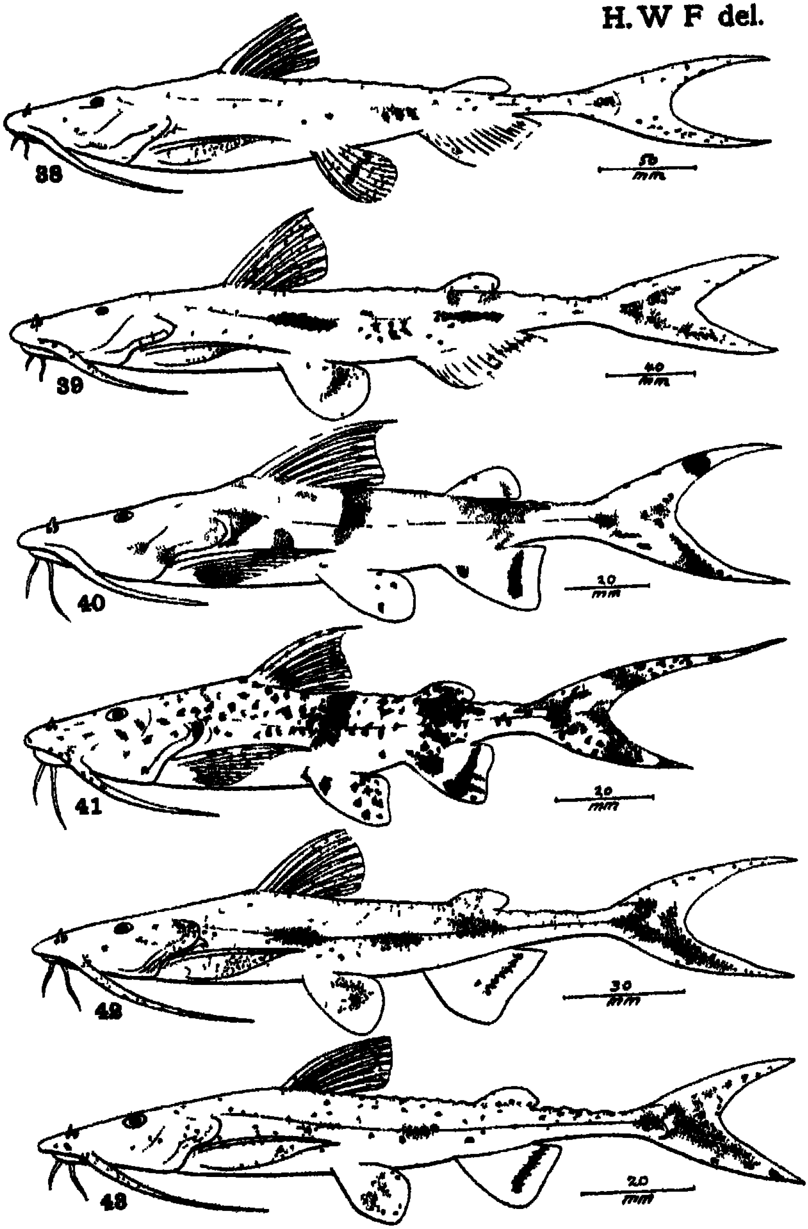
A N S P, No 67,902 Bangkok, Siam Type Length 158 mm Also Nos 67,903 to 67,905, paratypes, same data Length 133 to 163 mm.

Resembles *Pangasius taenıura* Fowler, but with shorter barbels, more anal rays and more greatly contrasted coloration

(For Will S Sutch, late of Philadelphia, to whom this Academy is indebted for many interesting local fishes)

PTEROPANGASIUS, new genus

Body elongately ovoid, strongly compressed, deepest at ventral base Well-developed cutaneous, median, abdominal keel Head rather small, compressed Snout short, broad, obtuse Eye lateral, advanced, little low as seen in profile, with free edge all around Maxillary not reaching eye, little developed Pair of maxillary and pair of mandibular barbels, both shorter than head Teeth in bands in jaws, and patch each side of vomer, minute Gill membranes cleft forward opposite middle of eye Gill rakers moderate, lanceolate Lateral line present Smooth skin covers top of head and humeral extension, which moderate Dorsal advanced, begins little behind end of humeral extension, its basal plate forming continuous bony bridge forward to occipital extension, fin nearly long as head, and with slender spine Adipose fin small, much nearer caudal than end of depressed dorsal, and about over last third of anal Anal long, low, about ⅖ of fish without caudal Caudal deeply forked, lobes sharply or slenderly pointed Caudal peduncle moderate, well compressed. Pectoral small, placed little below middle of depth, with slender spine Ventral small, its origin close behind base of first dorsal Type *Pangasius cultratus* H. M. Smith



38 to 43 *Bagarius bagarius* (variation)

Known among all the genera of its family by the remarkable median fleshy keel on the belly, extending from below the pectorals to the vent. Its contour is quite ovoid, with the lower profile more curved than the upper Other features are its even jaws, coloration, short barbels and dentition

(Πτερον fin + *Pangasius*, with reference to the long anal fin)

Pteropangasius cultratus (H M Smith) Figures 30 (upper and vomerine teeth), 31 (lateral view), 32 (ventral view of head and trunk), 33 (right pectoral spine)

Depth 3⅞ to 4¼, head 4½ to 4⅘, width 1½ to 1¾ Snout 3½ to 3⅝ in head, eye 3½ to 4, 1 to 1⅛ in snout, 2⅛ to 2½ in interorbital; maxillary reaches about ¾ in snout (in profile), length 3½ to 4 in head, mouth width 2⅝ to 2⅔, closed jaws even or lower slightly included, maxillary barbel reaches ¾ to ⅞ to pectoral origin, mandibular ⅝ to ¾, teeth sharp pointed, in moderately wide bands in jaws and small rounded patch each side of vomer, interorbital 1¼ to 1⅗ in head, broadly convex. Gill rakers 4 + 10, lanceolate, subequal with gill filaments or 2½ in eye

Skin smooth, entire Narrow occipital extension reaches 1⅓ in predorsal, reaches basal dorsal plate Humeral extension half of depressed pectoral Lateral line complete, axial, with numerous small branches along its whole course both above and below

D I, 7, fin 1⅒ to 1¼ in head, spine with front edge entire or with only 4 or 5 feeble, low serrae subterminally, inner edge with 11 to 13 antrorse serrae, adipose fin 3 to 3⅜ in head, A IV, 38, I to IV, 40, I, fin height anteriorly 2¼ to 2⅘, caudal 3⅛ to 4¼ in rest of fish, lobes subequal, least depth of caudal peduncle 3 to 3⅛ in head, pectoral 1 to 1⅙, rays I, 12, spine with outer edge keeled bearing 4 or 5 feeble, low, antrorse, subterminal serrae, 13 to 18 antrorse serrae on inner edge, ventral rays I, 6, fin 2 to 2⅛ in head

Back and upper surface of head brown to dark gray Dark band along front of lateral line and another parallel from humeral extension Sides of head and under surfaces whitish, also lips Iris gray Barbels pale Dorsal whitish, fin gray terminally Adipose fin gray Caudal pale or whitish, hind border gray Paired fins whitish, grayish terminally

Seven, 135 to 180 mm , Me Poon

BAGARIIDAE

Bagarius bagarius (Buchanan-Hamilton) Figures 38 to 43 (variation)

Six, 132 to 385 mm., Kemrat.

TACHYSURIDAE

Tachysurus caelatus (Valenciennes)

One, 73 mm , Paknam All mental barbels very dark brown Adipose fin pale, only little brownish marginally

Hemipimelodus borneensis (Bleeker).

Depth 4½ to 4⅘, head 4, width 1¼ to 1⅓ Snout 3⅛ to 3⅜ in head; eye 8½ to 9½, 2⅓ to 2⅘ in snout, 3 to 3½ in interorbital; maxillary reaches ½ to ⅝ in snout, length 3⅘ in head, mouth width 2⅞ to 3, lower jaw shorter; lips broad, fleshy, feebly striated or plaited transversely, maxillary barbel reaches ⅘ to ⅞ to pectoral origin, outer mental ⅔ to ⅘, inner mental ⅔ of outer, band of fine villiform teeth in each jaw, none on palate, interorbital 2⅞ to 3 in head, rather low, broadly convex, occipital fontanel extends from front of snout behind nostrils nearly to base of occipital extension, narrow at first, broadest in parietal region, occipital extension triangular, base 1⅔ its length Gill rakers 6 + 9, lanceolate, ⅔ of gill filaments, which 1¼ times eye

Skin smooth, firm Parietal and occipital region of head with rugose striate surfaces Humeral extension 3½ in depressed pectoral Axillary pore distinct Lateral line axial, complete, distinct and with well marked branches above and below throughout its course

D I, 7, fin 1⅛ to 1⅓ in head, strong spine with row of low short points its whole extent, about 16 along hind edge antrorse serrae, adipose fin 1⅔ to 1⅞ in head, A vi or vii, 10, i to 12, i, fin height 2 to 2⅛, caudal 3⅜ to 4 in rest of fish, deeply forked, least depth of caudal peduncle 3⅗ to 4 in head, pectoral 1¼, rays I, 10, outer edge of strong spine with row of small close set obtuse points and 25 antrorse serrae along inner edge, ventral 1⅔ to 1⅘, rays i, 5

Back and upper surface gray, sides below and under surface silvery white Pale or light area around eye, forward on snout and around its front end Maxillary barbel with brown edge, mental barbels white Fins all pale to whitish, dorsal dark gray terminally

Two, 163 to 180 mm , Bangkok

Hemipimelodus atripinnis, new species Figure 34

Depth 4, head 3⅓, width 1¼ Snout 3 in head, eye 6, 2 in snout, 3 in interorbital, maxillary reaches ⅞ in snout, length 3⅔ in head, mouth width 2⅔, lower jaw shorter, lips fleshy, with feeble transverse striae and papillae on chin behind lower, maxillary barbel reaches ½ in pectoral, outer mental reaches pectoral origin, and inner reaches ⅔, band of minutely villiform teeth in jaws and rather large rounded area well back on each palatine, interorbital 2⅞ in head, broadly convex, with broad median fontanel, narrowing behind and reaching occipital extension, last basally nearly broad as long Gill rakers 6 + 12, lanceolate, ⅔ of gill filaments, which 1⅛ in eye

Skin smooth Top of head rather coarsely rugose striate Humeral extension 3¼ in pectoral, with distinct axillary pore below Lateral line complete, axial, median along side with numerous close set branches along its whole extent both above and below.

D I, 7, fin little longer than head, pointed, adipose fin 2 in head, A iv, 14, i, fin height 1⅝, caudal 3¼ in rest of fish, deeply forked, least depth of caudal peduncle 3, pectoral 1 1/10, rays I, 10, spine (broken) with broad obtuse points along outer edge and antrorse serrae on inner, ventral rays i, 5, fin 1½ in head, vent opposite last ⅔ of depressed ventral.

Dark gray brown on back and upper surfaces, sides below and under surfaces silvery white Iris pale or whitish Lips pale or creamy Maxillary barbel dark brown Mental barbels all whitish Dorsal gray white basally, blackish terminally Adipose fin white basally, contrasted black terminally with narrow white edge all around Anal fin white basally, blackish terminally Caudal pale basally, dark gray terminally Paired fins whitish basally, edges narrowly pale all around broad blackish terminal portions.

A N S P, No 67,906 Bangkok, Siam. Length 170 mm Type

Differs from *Hemipimelodus borneensis* chiefly in its contrasted fins, most of which blackish terminally It also has longer barbels than *H borneensis*

(*Ater* black + *pinna* fin)

BAGRIDAE

Mystus nigriceps (Valenciennes)

Two, 135 to 137 mm, Bangkok, 24 specimens, 123 to 167 mm, Pitsanulok, ten, 80 to 173 mm, Kemrat

Mystus micracanthus (Bleeker)

One, 138 mm, Kemrat Differs a little from Bleeker's figure as the dorsal spine is slender, pungent, and entire, about ⅓ length of head

Mystus vittatus (Bloch)

Eleven, 72 to 158 mm, Bangkok, one, 78 mm, Tachin, fifty, 78 to 144 mm, Pitsanulok, eighty-eight, 46 to 130 mm, Me Poon

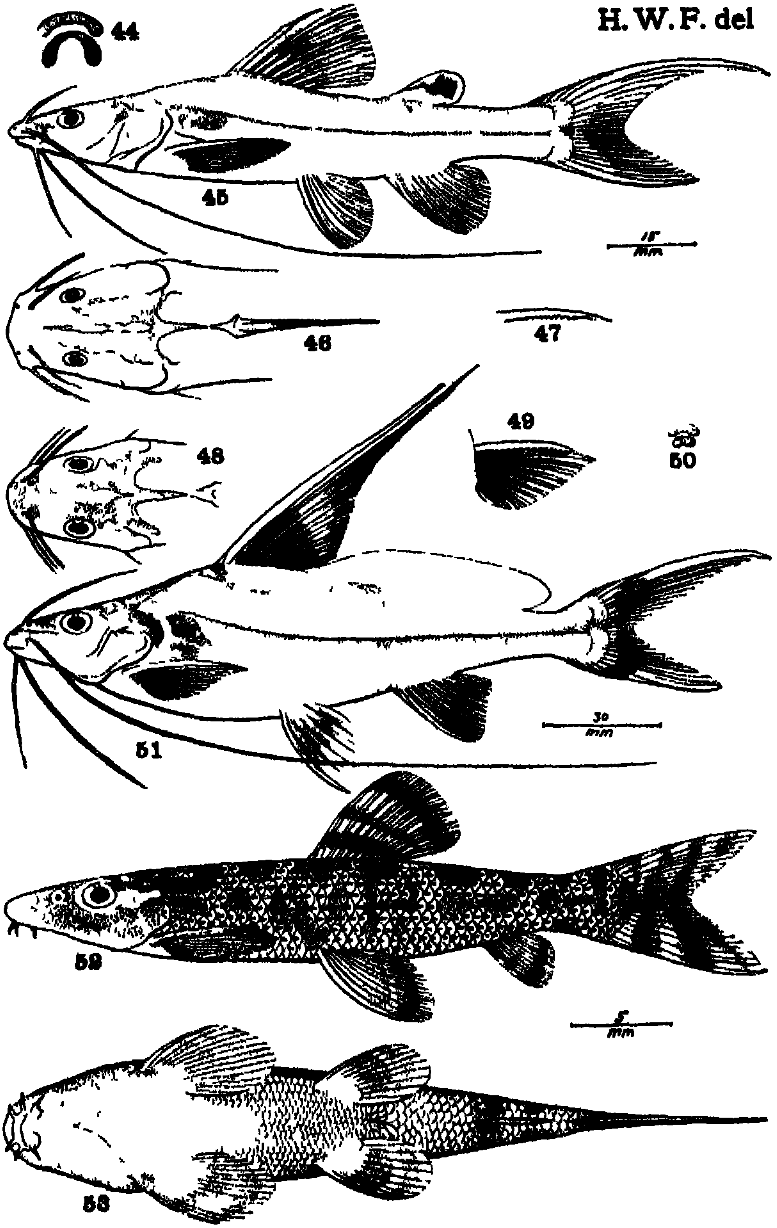
Mystus atrifasciatus, new species Figures 35 (upper and vomerine teeth), 36 (lateral view of type), 37 (right pectoral spine)

Depth 3¼ to 4, head 3¾ to 4, width 1¼ to 1⅓ Snout 2⅘ to 3⅒ in head, eye 3⅔ to 4⅔, 1¼ to 1½ in snout, 1⅓ to 1½ in interorbital, maxillary reaches ⅔ to eye, length 4⅓ to 4⅘ in head, mouth width 2⅔ to 2⅘, lower jaw shorter, lips fleshy, moderately broad, maxillary barbel reaches caudal base, nasal barbel ⅔ to ⅘ to hind edge of gill opening, outer mental barbel reaches nearly to or slightly beyond ventral origin, inner mental reaches ¼ to ⅓ in depressed pectoral, teeth minutely villiform, in moderate band in each jaw, and narrower parallel band of similar teeth on vomer, interorbital 2⅘ to 3, low, depressed, broad frontal fontanel extends from front of interorbital nearly to base of occipital extension, which narrowly triangular, reaching 1⅔ to dorsal origin Gill rakers 4 + 18, slender, lanceolate, 1⅓ in gill filaments, which 1⅔ in eye

Skin smooth Top of head, occipital bony bridge, opercle and humeral extension finely rugose striate Bony bridge from occipital extension to dorsal plate complete Humeral extension half of depressed pectoral Lateral line distinct, complete, axial, pores close set on very short inferior branchlets

D I, 7 or 8, fin height 1⅓ to 1⅔ in head, spine pungent, rather short, strong, front edge entire and 8 to 14 antrorse serrae along hind edge more or less terminally, adipose fin length 2¾ to 3⅓ in fish without caudal, A iii or iv, 9 or 10, fin height, 1⅘ to 1⅞ in head, caudal 2⅓ to 3⅒ in rest of fish, deeply forked, lower lobe little shorter, least depth of caudal peduncle 2¼ to 2¾ in head, pectoral I, 10, fin 1⅛ to 1⅓, spine strong, front edge entire, hind edge with 14 to 16 antrorse denticles, larger terminally; ventral rays i, 5, fin 1⅓ to 1⅘ in head, vent opposite first third in depressed ventral

Back and upper surface of head brown. Dark to blackish gray median lateral band, wide as vertical eye diameter and including lateral line, bounded above by whitish parallel longitudinal narrower band its whole



44 to 47 *Mystus nemurus* 48 to 51 *Heterobagrus bocourti*
52, 53 *Homaloptera maxinae*

extent, and below by whitish color of under surfaces of body Pale brownish streak, narrowing behind, back from pectoral axil until over front of anal. Iris gray Lips pale or whitish All barbels pale, with brown margins and nasal and maxillary pairs darker Fins all more or less dull brownish

A N S P, No 67,907 Pitsanulok, Siam Length 118 mm Type Also Nos 67,908 to 68,002, same data, paratypes Length 112 to 115 mm. No 68,003 Me Poon, Siam Paratype Length 110 mm

Distinguished from *Mystus vittatus* (Bloch) chiefly by its much longer adipose fin, in all my materials well exceeding the length of the head The dark lateral band traversing the lateral line is very distinct and contrasted, slate black in color

(*Ater* black + *fascia* band)

Mystus planiceps (Valenciennes)

One, 118 mm, Bangkok, ten, 60 to 128 mm, Tachin, four, 47 to 75 mm., Rayong

Mystus wolffii (Bleeker)

Ten, 72 to 176 mm, Bangkok, one, 53 mm., Pitsanulok, four, 49 to 140 mm, Tachin In small specimens the maxillary barbel quite variable, in one the left barbel only reaches the anal origin while the right reaches the caudal base In others the maxillary barbel reaches ⅗ of the adipose fin while in larger specimens to the middle of the caudal fin

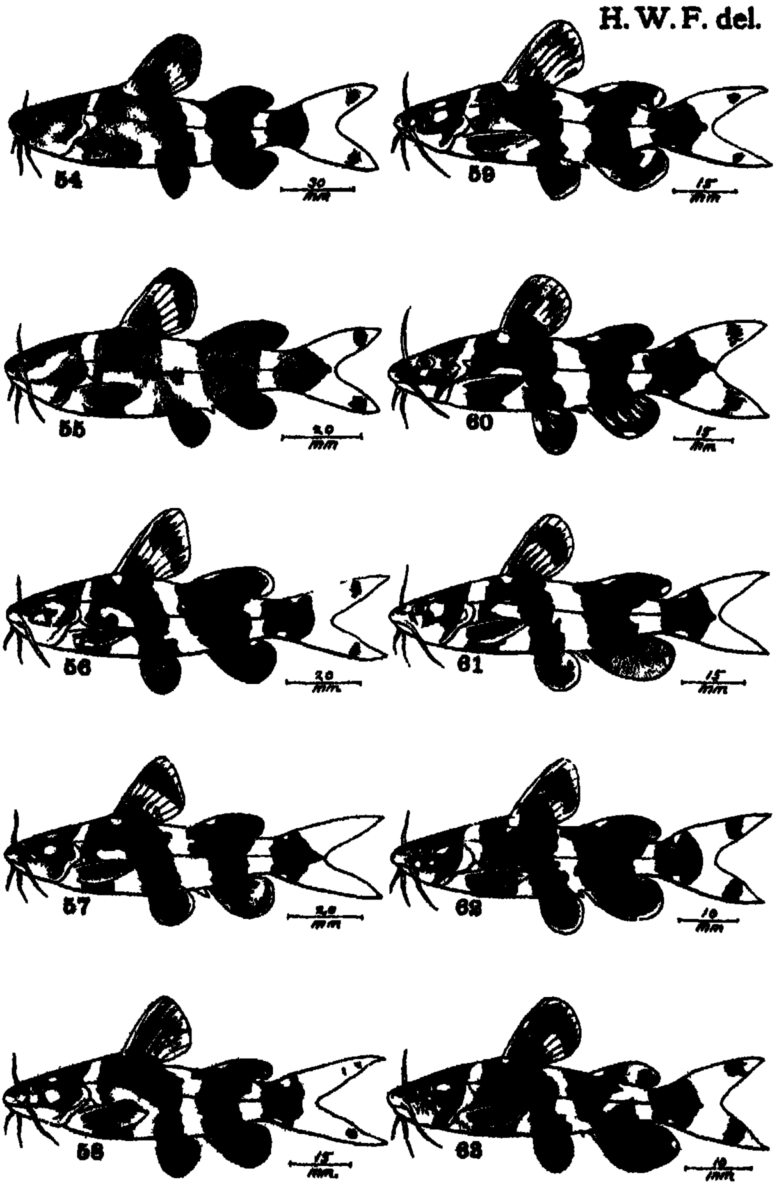
BRACHYMYSTUS, new subgenus

Distinguished from subgenus *Mystus* Gronow, by its broad and obtuse to nearly truncate snout, well protruding forward to the end of the lower jaw The mouth cleft very short, extending only ¼ to the eye Head large, depressed Maxillary barbel reaches anal Type *Bagrus nemurus* Valenciennes

(Βραχὺς short or broad, with reference to the snout + *Mystus*)

Mystus nemurus (Valenciennes) * Figures 44 (upper and vomerine teeth), 45 (lateral view, Me Poon), 46 (head above), 47 (right pectoral spine)

Depth 4⅕ to 5, head 3 to 3½, width 1⅗ to 1⅔ Snout 2⅘ to 3⅓ in head, eye 6 to 7½, 2 to 3 in snout, 2 to 2¾ in interorbital, mouth width 2¼ to 2⅘ in head, lower jaw shorter; maxillary extends ⅗ to ¾ to eye, length 3¼ to 3⅗ in head, maxillary barbel variable, reaches anal origin or caudal base, nasal barbel reaches ⅗ in eye or to hind eye edge, outer mental barbel reaches ⅓ to ½ in depressed pectoral, inner mental barbel reaches ⅔ to ¾ to pectoral origin, lips rather broad, fleshy, smooth, rather broad bands of villiform teeth in jaws, and parallel band on vomer expanded little each side posteriorly, interorbital 3 to 3½, low and flat, fontanel extends from hind part of snout to base of occipital extension, which narrow and slender, extending ⅗ of predorsal or to dorsal plate in small examples, or only ⅓ of space in larger examples Gill rakers 3 + 11, lanceolate, slender, 1⅓ in eye or in gill filaments



54 to 63 *Leiocassis albicollaris* (variation)

Skin smooth Cranium with low striae Humeral extension 2 to 3 in depressed pectoral Lateral line complete, distinct, axial along side of body, with small close set pores each at end of short inferior branchlet

D I, 7, first branched ray 1⅓ to 1⅗ in head, strong spine with front edge entire or with 3 or 4 feeble subterminal antrorse serrae, hind edge with 6 or 7 better developed, adipose fin 1⅗ to 2, A iv, 8, i, fin height 1¼ to 2⅓, caudal deeply forked, lobes slender, pointed, upper ending in filament and much longer than lower or 2⅗ to 3⅗ in rest of fish, least depth of caudal peduncle 3¼ to 4¼ in head, pectoral 1⅕ to 1⅗, rays I, 9, spine with front edge granular and 14 or 15 antrorse serrae along hind edge, smaller toward base of spine, ventral 1⅗ to 2¼ in head, rays i, 5

Back and upper surfaces gray brown, below whitish Iris gray Maxillary barbel pale, with brown edge, nasal barbel gray, mental barbels white Fins all more or less grayish terminally, pectoral pale to whitish

Fourteen, 120 to 188 mm , Bangkok, one, 125 mm , Pitsanulok, eight, 55 to 91 mm , Tachin, one, 137 mm , Me Poon, thirteen, 98 to 160 mm , Kemrat Differs from *Mystus wyckii* (Bleeker) in the striated upper surface of the head and much longer barbels

Leiocassis albicollaris Fowler Figures 54, 55 (Bangkok) 56 to 58 (Pitsanulok) 59 to 63 (Me Poon)

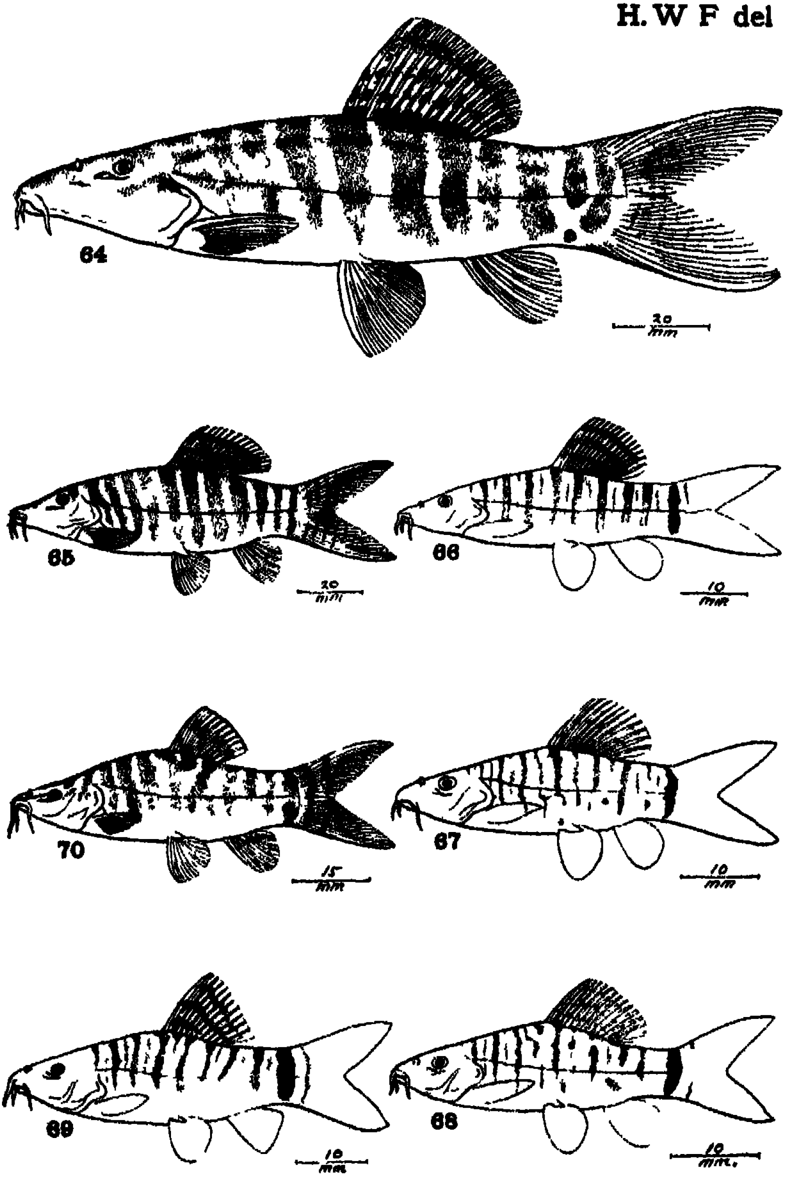
Two, 103 to 160 mm , Bangkok, three, 91 to 112 mm , Pitsanulok, five, 57 to 97 mm , Me Poon

Heterobagrus bocourtii Bleeker * Figures 48 (head above), 49 (right pectoral), 50 (upper and vomerine teeth), 51 (lateral view)

Depth 3¾, head 4, width 1¼ Snout 2½ in head, eye 4¾, 2 in snout, 1½ in interorbital, maxillary reaches 2½ to eye, length 4⅗ in head, mouth width 3⅗, lower jaw shorter, lips fleshy, rather narrow, papillate, nasal barbel reaches hind edge of gill opening or opercular flap, maxillary barbel reaches middle of caudal, outer mental barbel reaches ¾ in depressed pectoral, inner mental barbel reaches pectoral origin, teeth minutely villiform, in short, small, broad band in each jaw, followed above by similar smaller band close behind on vomer, interorbital 3⅓ in head, low, flat, with broad, deep, median fontanel from close behind nostrils on snout above to base of occipital extension Gill rakers 4 + 12, lanceolate, 1⅓ in gill filaments, which 2 in eye

Skin smooth Top of head and predorsal bridge finely rugose striate, also humeral extension, which 2⅓ in pectoral fin Predorsal bridge complete, with long slender occipital extension Lateral line axial, complete, with minute pores

D II, 7, first spine short and basal, second spine greatly elongate, little sinuous, 2 in fish without caudal, first ray 1⅖ and last ray long as snout, long adipose fin separated from dorsal by narrow notch, length ⅗ of fish without caudal, A iii, 8, first branched ray 1⅘ in head; caudal deeply forked, with long, slender lobes, lower ⅗ of upper which 3 in rest of fish, least depth of caudal peduncle 3⅓ in head, pectoral 1⅓, rays I, 11, spine with outer edge entire, inner edge with 22 antrorse strong denticles; ventral i, 5, fin 1⅓ in head



64 to 69 *Botia hymenophysa*   70 *Botia lucas-bahi*

General color drab, little paler below More or less ill defined pale parallel band along above and another along below dark band inclusive of lateral line Border of eye pale Lips pale Dark bar of scapula followed by pale or creamy crescent Barbels all more or less brownish Fins pale gray, transverse pale bar across dorsal, adipose fin paler posteriorly, caudal and paired fins darker basally

One, 189 mm, Pitsanulok This specimen agrees with Bocourt's figure, especially in that the shape of the dorsal and adipose fin is distinctive. Although I placed *Prajadhipokia rex* Fowler as a synonym in 1935, it seems to differ in so many characters as the gill rakers, teeth, and coloration that I now feel forced to reconsider it as valid

HOMALOPTERIDAE

Homaloptera maximae, new species Figures 52, 53 (ventral view)

Depth 6, head 3⅜, width 1¼ Snout 2⅙ in head, eye 4¾, 2½ in snout, 1⅜ in interorbital, mouth width 4⅜ in head, lips moderate, with 3 pairs of barbels, longest about half of eye, interorbital low, but slightly convex, 2½ in head Gill rakers not evident, gill filaments 1¼ in eye

Scales 40 + 2 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin, 14 predorsal Chest, breast and front of belly naked Caudal base scaly Scales with 6 or 7 short marginal basal striae, 4 or 5 apically On back and sides of body each scale with transverse horizontal ridge, form prominent longitudinal series of which median, lateral, or of lateral line, most distinct Rows of scales converge rather closely on posthumeral region Scales on under surface of body without keels

D ii, 9, i, first branched ray 1¼ in head, A i, 6, first branched ray 2⅓, caudal 3¼ in rest of fish, forked, lobes pointed, least depth of caudal peduncle 3⅓ in head, pectoral 1⅓, rays ii, 12, ventral rays i, 9, fin 1⅓ in head

Light brownish generally, pale to whitish on under surfaces On back 9 dark brown saddles of which 2 at dorsal base and 4 postdorsal, though of last two last now rather indistinct Lips and mouth pale, also border around eye and nostrils Iris gray Irregular dark blotches along side of body Fins grayish, with darker margins, as 3 dark bands across dorsal, 3 or 4 on caudal, and 2 on each of paired fins

A N S P, No 68,004 Tachin, Siam Length 44 mm Type

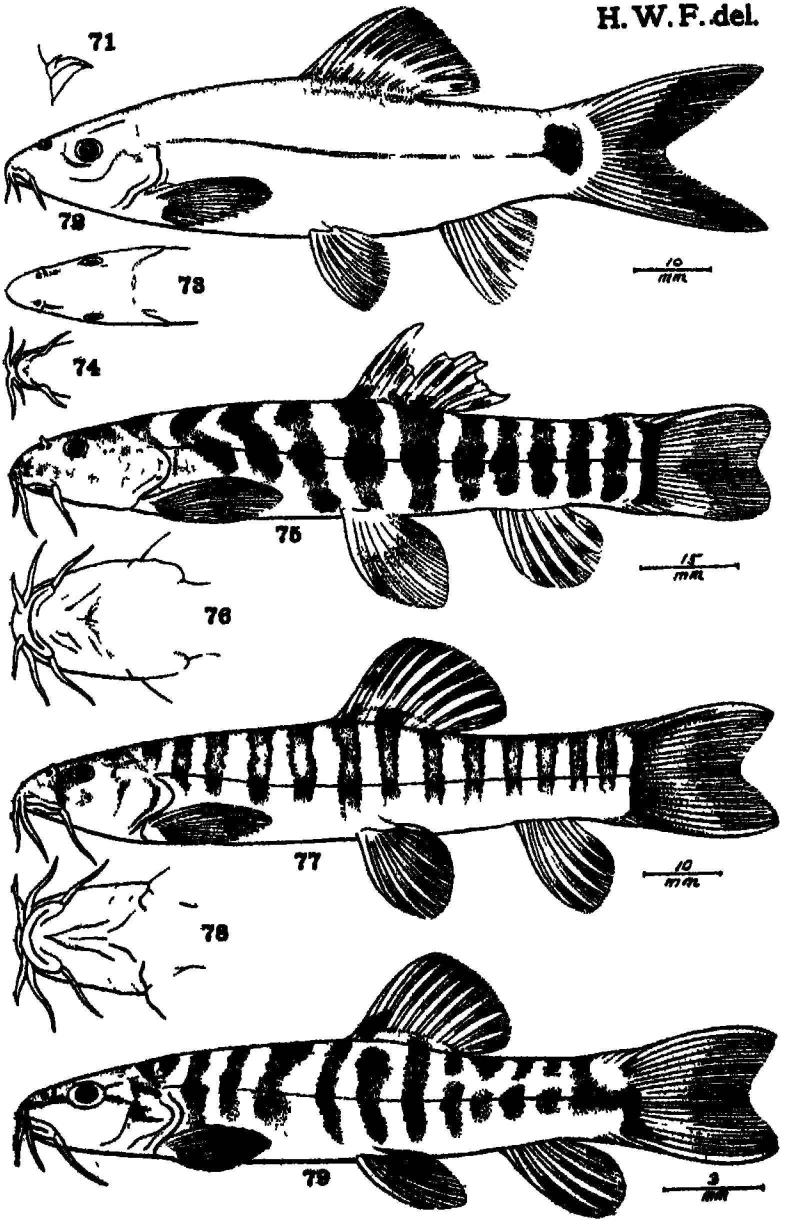
An interesting species with shorter pectorals than in the three Siamese species I noticed in 1934 This species is much like *Homaloptera weberi* Hora, from Borneo, though with keeled scales and much shorter pectoral.

(For Miss Maxine de Schauensee, daughter of Mr. and Mrs Rodolphe Meyer de Schauensee)

COBITIDAE

Acanthopsis choirorhynchus (Bleeker)

Two, 81 to 94 mm, Bangkok, four, 89 to 151 mm, Kemrat; one, 121 mm, Me Poon, only with dark lateral line present, one, 278 mm, Pitsanulok, gravid female with ova, therefore depth 5¼.



71 to 74 *Botia lecontei.* 75, 76 *Nemacheilus sexcauda*
77 to 79 *Nemacheilus waltoni.*

Four, 69 to 78 mm, Tachin In most the only color pattern remaining is the narrow, dark gray streak including the lateral line All show a more or less perfected dark line along the side of the snout to the eye.

Botia hymenophysa (Bleeker) Figures 64 (Kemrat), 65 (Bangkok), 66 to 69 (Tachin)

One, 120 mm, Bangkok, one, 165 mm, Kemrat, four, 43 to 55 mm, Tachin

Botia lucas-bahi, new species Figure 70

Depth 3, head 3⅓, width 3 Snout 2¼ in head, eye 7, 3½ in snout, 1⅓ in interorbital, maxillary extends $\frac{4}{7}$ to eye, length 4 in head, 4 rostral barbels rather long, anterior or inner pair 2½ in head, preorbital spine reaches half way in eye, with strong anterior prong, lips smooth, rather narrow, interorbital 5, convex Gill rakers 12 short, low, rudimentary points, greatly less than gill filaments, which ⅞ of eye

Scales very minute, embedded Lateral line complete, axial, distinct

D II, 9, I, first branched ray 1½ in head, A II, 5, first branched ray 1⅞, caudal 3⅛ in rest of fish, deeply forked; least depth of caudal peduncle 1¾, pectoral 1⅞, rays I, 14, ventral rays I, 8, fin 2⅛ in head

General color dull brownish, pale to whitish below About 10 transverse darker vertical bands on body, each broader than pale interspaces, and less distinct below Scattered over side of body innumerable dark dots, and 2 or 3 irregular rows of larger small dark spots above and 1 or 2 below parallel with course of lateral line Iris gray Barbels brownish Dark streak along side of snout to eye and another on each side of top of head back to front of predorsal Dorsal and caudal very pale or whitish, on former narrow black upper margin and 2 irregular series of black blotches, on caudal 3 transverse dark bands of which basal blackish Lower or paired fins pale to whitish, anal with a few gray spots

A N S P, No 68,005 Tachin, Siam Length 73 mm. Type

Apparently differs from *Botia beauforti* H M Smith, which I wrongly assumed may be synonymous with *B hymenophysa* The Chieng Mai specimen I also reported as *B hymenophysa*[2] 90 mm long I now place as paratypic with the present species It may easily be distinguished from *B hymenophysa* or any other Siamese *Botia* by the black upper edge to the dorsal fin, besides other features of coloration

(Named for Mr Lucas Bah, whose industry has added much to the value of our Siamese collections of fishes)

Botia horae H M Smith.

One, 51 mm, caught in December 1932 at Chieng Mai in the Me Nam Ping. It was brought home alive, and lived in a sixty-gallon aquarium until September 27, 1936, without any apparent change It is like my two figures, wrongly referred to *B modesta*,[3] though not showing the four dark supralateral vertical streaks as given by Smith Its caudal is also greatly spotted

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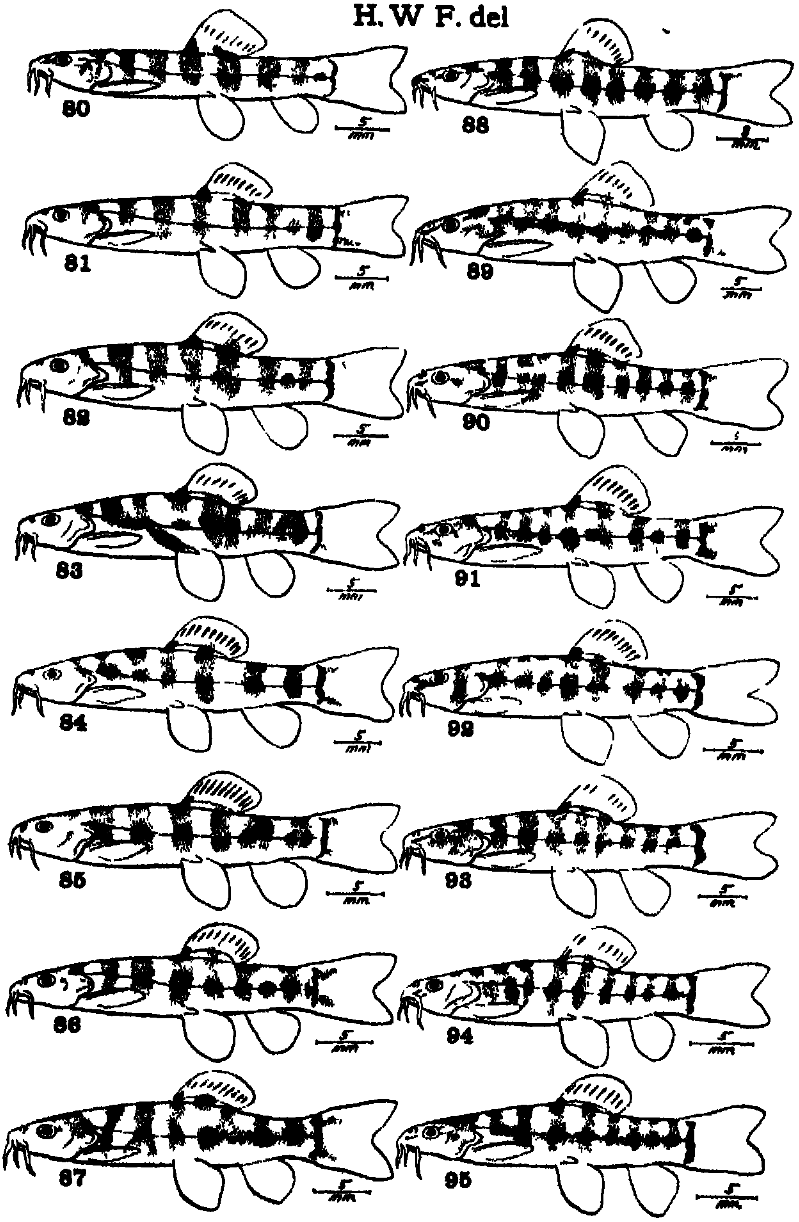
[2] Proc Acad Nat Sci Phila, vol 86, 1934, p. 101, fig 52

[3] Proc Acad Nat Sci Phila, vol 86, 1934, p 101, figs 53 and 54



80 to 87 *Nemacheilus beavani* (variation) 88 to 95 *Nemacheilus desmotes* (variation).

Botia modesta Bleeker

Five, 112 to 156 mm, Pitsanulok; two, 118 to 123 mm, Kemrat

Botia lecontei, new species Figures 71 (preorbital spine), 72 (lateral view), 73 (head above), 74 (mouth below)

Depth 3½, head 3½, width 2. Snout 2¼ in head, eye 6¼, 3 in snout, 2 in interorbital, maxillary reaches 2⅜ to eye, length 5¼ in head, 4 rostral and 2 maxillary barbels, anterior rostral 3⅓ in head, mouth width 6, lips fleshy, entire, interorbital 3½, moderately high, convex, preorbital spine strong, well curved, with well developed superior anterobasal prong, spine length 3⅜ in head Gill rakers about 12? very short, low, weak points, ⅙ of gill filaments, which equal eye

Scales microscopic, feeble, simple, rounded, non-imbricate and imbedded, not distinguishable without a lens or microscope Lateral line prominent, axial, straight, continuous and pores numerous and very minute

D iii, 8, i, first branched ray 1½ in head, A iii, 5, i, first branched ray 1⅔, caudal 2⅝ in rest of fish, deeply forked, triangular lobes sharp pointed, least depth of caudal peduncle 2 in head, pectoral 1¼, rays i, 12, ventral i, 7, fin 1⅔ in head, with narrowly triangular axillary papilla long as eye, vent midway between ends of depressed ventrals and anal origin

Back and upper surface of head dull uniform brown, with pale shade above lateral line on caudal peduncle before large diffuse dark gray blotch at end of lateral line or at caudal basally, its diameter less than twice eye Iris gray Under surface of head, including mouth and barbels, also belly and tail, pale to whitish Dorsal pale brownish, with 2 ill defined longitudinal, parallel, gray brown bands, both obscure Caudal pale brownish Lower fins uniform

A N S P, No 68,006 Kemrat, Siam Length 100 mm Type

Only the type obtained The species may be known by its trim, shapely form, much more slender than *Botia modesta,* and in the presence of the dark gray blotch at the caudal base

(For Dr John L LeConte, the distinguished entomologist of past generations, and a contributor to the Academy collection of fishes)

Nemacheilus beavani Gunther Figures 80 to 87 (variation)

Eight, 35 to 42 mm, Me Poon In this species only 2 dark transverse bands behind the dorsal, exclusive of the blackish bar on the caudal base. Caudal but little emarginate.

Nemacheilus thai Fowler.

Series of 46 specimens, 25 to 59 mm, Me Poon.

Nemacheilus desmotes Fowler Figures 88 to 95 (variation).

Ten, 28 to 52 mm, Me Poon

Nemacheilus sexcauda, new species Figures 75, 76 (mouth below)

Depth 5⅗; head 4, width 1¼ Snout 2½ in head; eye 7, 2⅔ in snout, 3 in interorbital, low, broadly convex, maxillary not quite reaching opposite front eye edge, length 3 in head; 6 long barbels, front rostral pair shortest or reach ¾ to eye, outer rostral reaches little beyond front of eye or 2⅓ in head, maxillary barbel reaches 1⅓ to pectoral origin, mouth width 2½ in head, moderately fleshy lips entire, front of upper jaw with short transverse or anterior bony edge, this received in depression at symphysis of mandible which furnished on either side with rather high trenchant bony ridge, so appearance of mandible somewhat spout-like inside lips, interorbital 3 in head, rather low, broadly convex. Gill rakers 3 + 10 low points, ¼ of gill filaments, which 1⅛ times eye

Scales very small, cycloid, rounded, slightly imbricated, firmly adherent, absent or little distinct on front of predorsal and chest Lateral line distinct, axial, complete, with minute close-set pores

D II, 8, I (ends of rays damaged), first branched ray 1⅗ in head, A III 5, I, second branched ray 1⅘, caudal 1⅙, broad, hind edge but slightly emarginate, least depth of caudal peduncle 2, pectoral 1⅓ rays I, 11, ventral rays I, 7, fin 1⅕ in head, narrow, pointed axial papilla 1¼ times eye Vent at ends of depressed ventrals

General color brown, under surfaces slightly paler Eleven dark brown transverse bands on body, wider than pale interspaces, of these 4 predorsal and 2 below dorsal little sinuous so 5 narrower vertical bands remain crowded behind dorsal, in addition to still narrower and greatly contrasted black transverse basal caudal band Few small scattered black dots or spots on interorbital and occipital regions, beside few on opercle and right cheek Iris gray Barbels brownish Dorsal pale, basally whitish with black blotch at origin and rays with brown bar terminally, besides small brown spot on each ray basally Caudal brown, except for dark basal bar Anal pale, whitish basally, and each branched ray terminally with 2 dull brownish spots Paired fins pale, each branched ray with 2 or 3 slightly darker spots terminally, though under surface of pectoral pale and spots only show on upper surface

A N S P, No 68,007 Me Poon, Siam. Length 116 mm Type

Related to *Nemacheilus semi-cincta* (Blyth), but with one more dark band on the tail Hora says of that species 10 or 11 broad dark transverse bands present, his figure[4] showing 11

(*Sex* six + *cauda* tail, with reference to the six dark transverse bands behind the dorsal fin)

Nemacheilus waltoni, new species Figures 77 (type), 78 (mouth below), 79 (young).

Depth 5 to 5⅓, head 3⅔ to 4, width 1⅗ to 1⅞ Snout 2½ to 3⅓ in head, eye 4½ to 7, 1½ to 3 in snout, 1½ to 2¼ in interorbital, maxillary not quite reaching opposite front of eye, length 3 to 3⅓ in head, 6 long barbels, front rostral pair shortest reach ¾ to, or to eye, outer rostral reaches 1⅔ to 2 to pectoral origin, maxillary barbel reaches 1⅛ to 1⅓, mouth width 3 to 3¼ in head, moderately fleshy lips entire, front of upper jaw with short transverse trenchant bony edge, received in depression at mandibular symphysis giving rise either side to elevated trenchant bony ridge, appearing spout like, interorbital 3⅛ to 3¼, low, broadly convex Gill rakers 3 + 12 short points, ¼ of gill filaments, which subequal with eye.

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[4] Records Indian Mus., vol 31, pt 4, Dec. 1929, p 336, pl 14, fig. 3.

Scales very small, cycloid, rounded, slightly imbricated, firmly adherent, finer or much smaller or less distinct on predorsal, also indistinct or absent on chest Lateral line distinct, axial, complete, with minute, close set pores

D. III, 8, I, first branched ray 1⅜ to 1½ in head, A III, 5, I, second branched ray 1½ to 1⅜, caudal 1 to 1⅛, little emarginate or concave behind, points of lobes distinct when expanded, least depth of caudal peduncle 1⅘ to 2, pectoral 1⅛ to 1½, rays *I*, 12, ventral rays I, 7, fin 1¼ to 1⅓ in head, with slender, pointed, axillary papilla 1¼ times eye, smaller in young Vent at ends of depressed ventrals

Dull or pale brownish generally, under surfaces slightly paler Thirteen dark brown transverse bands on body, little wider than pale interspaces and with age narrower, each showing darker margin or bordering line, 5 of bands predorsal and 3 from below dorsal, besides 5 remaining bands behind dorsal, in addition to narrow, black, contrasted band at caudal base Some obscure dark blotches on top of head and front of snout Iris gray Barbels pale brown, front rostral pair dark on outer basal portion and outer, longer, rostral pair dark all along outer edge Dorsal pale, creamy to white basally, with contrasted black blotch at front of fin and another slightly paler over second dark band from dorsal base, each ray with broad dark brown median bar Caudal brown, save for black basal band, upper and lower fulcra and edges of fin pale to whitish Other fins pale to whitish, with upper surface of pectoral pale brown

A.N S.P , No 68,008 Me Poon, Siam Length 102 mm Type Also Nos 68,009 and 68,010, same data, paratypes Length 26 to 45 mm

Known chiefly by its coloration, the arrangement of the broad, dark, transverse bands as 5 or 6 predorsal, 3 from dorsal base and 6 postdorsal (inclusive of dark basal caudal band) The species is suggestive of *Nemacheilus kengtungensis*, differing in the arrangement of its dark transverse bands

(For Joseph Walton, a contributor to the Academy's collection of fishes in its early history)

POGONONEMACHEILUS new subgenus

Differs from the typical species of subgenus *Nemacheilus* in the very long barbels, the preorbital hook and the deeply forked caudal fin, with its extended upper lobe Type *Nemacheilus masyae* H M Smith

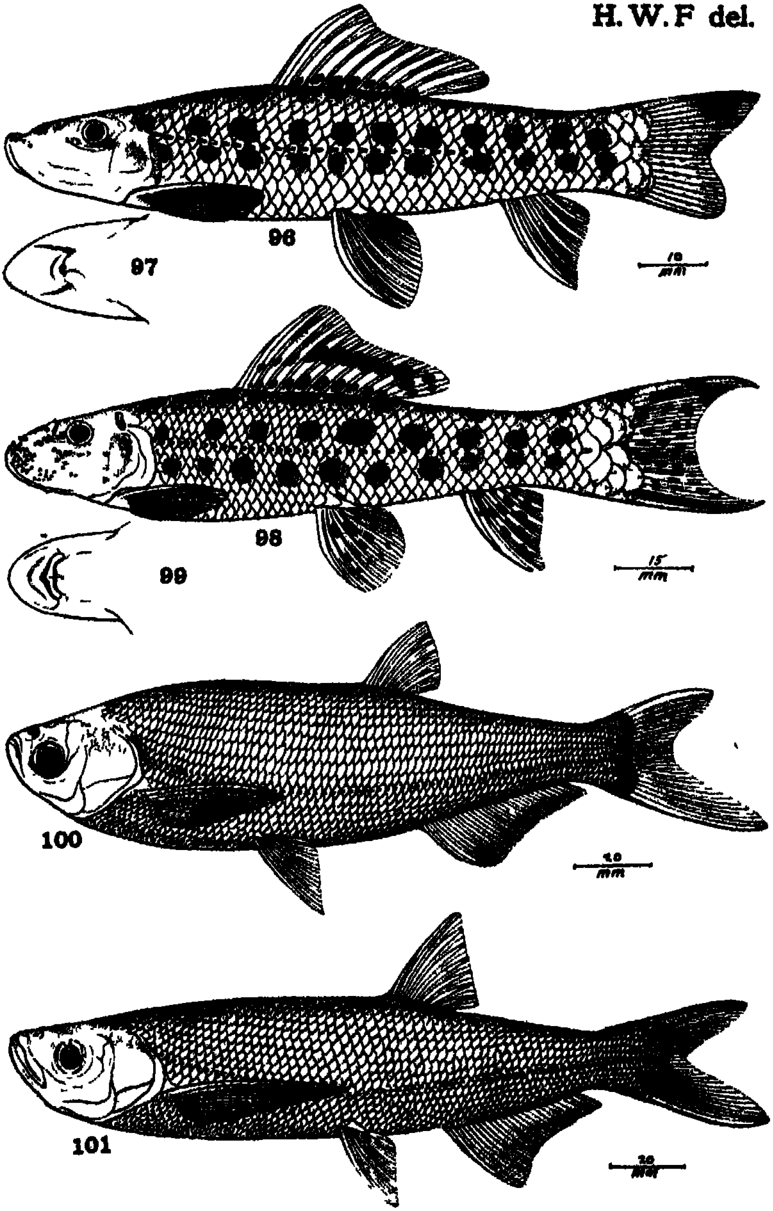
(Πώγων beard + *Nemacheilus*, with reference to the long barbels)

Nemacheilus masyae H M Smith

Three, 54 to 62 mm , Me Poon

GYRINOCHEILIDAE

Body elongate, moderately compressed, rather slender Head rather small, nearly pyramidal Snout long, depressed Eye with free edge, small, high, postmedian No rostral fold. Above and anteriorly on snout a transverse groove, continued below and around each corner of mouth to postlabial groove Upper lip rather broad, fleshy, emarginate medially, its



96, 97 *Gymnocheilops kaznakoi* 98, 99 *Gymnocheilops pennocki*
100 *Longiculter siahi* 101 *Culter wolfi*

outer surface papillate, inner surface with small rasp-like papillae, lower lip medially triangular, with 6 or more transverse plicae; laterally in conjunction with upper lip forms an involuted prolongation No barbels Gill opening rather narrow, lateral, above with conspicuous deep slit not covered by opercle and closed inside by a movable flap Gill membranes very broadly united to isthmus Pharyngeals slender, without teeth Scales moderate or rather small; with radiating marginal striae all around, medially joined by reticulations Lateral line complete, axial along side of body Dorsal moderate, with 3 simple and 9 branched rays Anal short, behind dorsal, with 3 simple and 5 branched rays Caudal moderate, emarginate Pectoral low, broad Ventral short Type genus *Gyrinocheilus* Vaillant

Hora in 1923 pointed out the similarity of these fishes to *Garra* and *Crossocheilus*, " but this outward similarity, in my opinion, is directly correlated with the life of these fishes in moderately rapid-running waters " At the same time he created their elevation to family rank, stressing the toothless pharyngeals, scale structure, the remarkable modified inhalent and exhalent apertures of the gill-openings, and mouth, lip and jaw structures The genera may be distinguished as follows

Predorsal scales small, scales on caudal base small, eye well postmedian or near last third in head, 2 rows of large, dark, alternating or opposed spots along side of body *Gyrinocheilus*

Predorsal scales very small and crowded, scales on caudal base large, eye slightly postmedian in head, 2 rows of large dark spots only partly or not at all alternating along side of body .*Gyrinocheilops*

GYRINOCHEILOPS, new genus

Eye but little postmedian in head length Predorsal scales very small and crowded Ventral origin premedian in length of dorsal base. Caudal deeply emarginate, with rather slender, pointed lobes Pearl organs of different arrangement and apparently more extensive than in *Gyrinocheilus* Coloration with 2 rows of dark lateral spots mostly opposed Type *Gyrinocheilops pennocki*, new species

Related to *Gyrinocheilus* Vaillant (type *Gyrinocheilus pustulosus* Vaillant) of Borneo, which differs in the eye center at last third in the head, larger and less numerous predorsal scales, and ventral origin about opposite last ⅔ of dorsal base.

(*Gyrinocheilus* + ὤψ appearance)

Gyrinocheilops kaznakoi (Berg) Figures 96 (Chieng Mai), 97 (mouth below).

Gyrinocheilus kaznakoi Berg, Comp Rend Trav Soc Imp Nat St Petersbourg, vol 37, 1906, pp 305, 367 (type locality, Pai-lin between Battambang and Schantaburi).—H M Smith, Journ Siam Soc Nat Hist Suppl, vol 8, No 3, Sep 1931, p 187 (Nontaburi, Paknam, Bung Barapet, Pak Jong, Udon, east of Bandon, Lampang, Potaram, north of Kanburi) —Fowler, Proc Acad Nat. Sci Phila, vol. 86, 1934, p 137 (Chieng Mai, Metang R 35 miles above Chieng Mai, foot of Chieng Dao).

? *Psilorhynchus aymonieri* Tirant, Bull Soc Etud Indochin., 1883 [1929, reprint, p 35, pl 1, figs 1 and 2] (type locality, " petits affluents du Prek-Tenot dans les montagnes de Samrong-Tong, à 75 kilomètres de Phnom-Penh ", Cambodia)

? *Gyrinocheilus aymonieri* Hora, Rec Indian Mus., vol. 37, pt. 4, Dec. 1935, p 461, fig 1 (outline photo of type)

One, 55 mm, Paknam, four, 54 to 60 mm., Tachin These all agree with the series I reported in 1934, especially in the shape of the preoral region

The original barbaric figures of *Psilorhynchus aymonieri* Tirant, together with the incomplete description, even when viewed with Hora's outline of the type, hardly reveal certain identification with Berg's *Gyrinocheilus kaznakoi*

Gyrinocheilops pennocki, new species Figures 98 (type), 99 (mouth below)

Depth 4⅛ to 4¼, head 3⅛ to 3⅜, width 1⅘ to 1⅞ Snout 2¼ to 2⅓ in head, eye 4⅞ to 5⅛, 2¼ to 2¾ in snout, 2 to 2½ in interorbital, maxillary not quite reaching opposite front of eye, length 2⅘ to 2¾ in head, mouth width 3 to 3¼, broad fleshy lips finely papillate, interorbital 2½ to 2¾ in head, low, depressed, medially slightly concave Gill rakers about 40 close set, compressed, pointed, flexible laminae, ¼ of gill filaments, which equal eye

Scales 39 or 40 + 2 in lateral line, 8 above, 5 below to ventral, 6 below to anal, 23 or 24 predorsal Pectoral with adnate triangular cutaneous pad in axil, length 2⅓ in fin Ventral with axillary scale 2½ in fin Scales enlarged on caudal base medially Chest and breast naked Scales with 12 to 14 basal radiating striae, with 3 to 5 more incomplete auxiliaries, 7 to 10 complete apically, and 10 to 22 more incomplete auxiliaries Lateral line complete, axial, straight, tubes short and simple Pearl organs as irregular double preorbital row forward of nostrils, on upper front ridge of snout row of 6 more or less extended forward, on front edge of snout outer row of 6 large tubercles with 2 inner ones each side and closely set, all directed upward, preorbital region below and behind described region all more or less studded with tubercles Smaller example with less elaborate ornamentation, though of similar pattern and tubercles fewer

D ii, 10, i, first branched ray 1¼ to 1⅓ in head, A iii, 5 i, first branched ray 1⅝ to 1⅗, caudal 2⅘ to 3¼ in rest of fish, rather deeply emarginate and sharp points of lobes distinct, least depth of caudal peduncle 2 to 2¾ in head, pectoral 1⅛ to 1⅓, rays i, 13, ventral rays i, 8, fin 1⅘ to 1½ in head Vent at last ⅜ to ⅓ of depressed ventrals

Brownish above, paler to whitish below Along side 9 dark to blackish gray spots in row above lateral line and another below, most of spots in rows nearly or quite opposite Along back row of 11 similar dark spots, these not regular with lower spots and some alternated Eye grayish Lips pale like under surface of head Dorsal grayish, with 2 rows of rather large brownish spots on membranes, one median and other basal Caudal pale to whitish, spotted with dark gray, of which some of upper terminal ones little larger Lower fins all more or less whitish, spotted with gray and dark sub-terminal blackish bar or pectoral

A.N.S.P., No. 68,012 Kemrat, Siam Length 145 mm Type. Also No. 68,013, paratype, same data Length 78 mm

Differs from *Gyrinocheilops kaznakoi* (Berg) in the form of the preoral region, the more advanced eye and the absence of the black spot behind the upper end of the upper section of the gill-opening.

(For the late Charles J Pennock, of Kennett Square, Pennsylvania, an ornithologist to whom I am indebted for various North American fishes)

CYPRINIDAE

ABRAMIDINAE

LONGICULTER, new genus

Body elongately ovoid, strongly compressed, abdominal edge cultrate Head small, well compressed Snout moderate, greatly broader than long, obtuse Eye well advanced, little below median axis of head Mouth superiorly terminal, its front end above level of upper edge of eye, subvertical Maxillary short, not reaching eye Lips thin, narrow, jaw edges entire and trenchant Interorbital high, broad Nostrils close together, high or close to upper profile, without cutaneous flap, and posterior greatly larger Suborbitals narrow Gill opening large, deeply cleft, extends forward opposite hind eye edge, membranes joined to isthmus Gill rakers very fine, slender, rather long, numerous, closely set Pseudobranchiae large, though smaller than gill filaments Pharyngeal teeth small, biserial, bones small Scales in even longitudinal series, small, numerous, narrowly imbricated Abdominal scales not passing over abdominal keel Ventral with small axillary papilla Caudal base broadly scaled Lateral line complete, little decurved Dorsal little postmedian, small Anal longer than head, begins behind dorsal, front rays little higher Caudal deeply emarginate Caudal peduncle short, well compressed Pectoral rather long, falcate, reaches beyond front of ventral, placed low Ventral moderate, not quite reaching opposite dorsal origin Type *Longiculter siahi*, new species

Differs from *Culter* and related genera in its well-elongated and strongly compressed body

(*Longus* long + *Culter*)

Longiculter siahi, new species Figure 100 (type)

Depth $3\frac{4}{5}$ to $3\frac{2}{3}$, head $4\frac{3}{5}$ to $4\frac{1}{2}$, width $2\frac{1}{4}$ to $2\frac{1}{2}$ Snout $4\frac{3}{5}$ to 5 in head from snout tip, eye 4, little greater than snout, $1\frac{1}{8}$ to $1\frac{1}{4}$ in interorbital, marginal adipose-like membrane only moderately invading iris, end of closed maxillary not quite opposite lower level of lower edge of pupil, length $4\frac{3}{5}$ to $5\frac{1}{4}$ in head from snout tip, interorbital $2\frac{9}{10}$ to $3\frac{1}{5}$, convex, narrow suborbitals cover half of cheek to preopercle ridge Gill rakers 16 + 90, lanceolate, very slender, equal gill filaments or $1\frac{3}{4}$ in eye Pharyngeal teeth 2, 4 — 4, 2, scarcely hooked, large ones with broad, entire grinding surfaces

Scales 70 to 72 + 4 in lateral line, 12 above, 6 below to ventral, 7 or 8 below to anal origin, 71 to 72 predorsal Pectoral without axillary scale Ventral with short adnate pointed axillary papilla Lateral line complete, well decurved forward, extending low along side of tail till median at caudal base, tubes small, short, simple Scales with 4 to 7 apical radiating striae, basal circuli fine, none extended apically

D II, 7, I, first branched ray $1\frac{3}{5}$ to $1\frac{2}{3}$ in total head, A III, 21, I or III, 30, I, first branched ray $1\frac{2}{3}$, caudal $3\frac{1}{3}$ to $3\frac{4}{5}$ in rest of fish, upper lobe $1\frac{3}{5}$ to $1\frac{1}{2}$ in lower lobe, least depth of caudal peduncle $2\frac{3}{5}$ to 3 in total head, pectoral 4 in fish without caudal, rays I, 14; ventral I, 8, length $1\frac{1}{4}$ to $1\frac{2}{3}$ in total head length Vent close before anal

Back brownish, sides and below pale, evidently whitish in life Iris grayish Jaws and under surface of head pale Fins all light or pale, dorsal and caudal little grayish terminally

A N S P, No 68,014 Me Poon, Siam Length 200 mm Also No 68,015, same data, paratype Length 198 mm

A unique species, distinguished chiefly by its generic characters

(For Mr Y Siah, who assisted in forming the collection of Siamese fishes)

Culter siamensis (Gunther)

Depth $3\frac{1}{2}$ to $3\frac{5}{8}$, head $3\frac{3}{4}$ to 4, width $2\frac{1}{4}$ to $2\frac{1}{3}$ Snout $3\frac{1}{3}$ to 4 in head from snout tip, eye $3\frac{1}{2}$ to $4\frac{1}{8}$, larger than snout in young to subequal with age, 1 to $1\frac{5}{8}$ in interorbital, maxillary reaches nearly to or below front eye edge, length $2\frac{1}{2}$ to $2\frac{2}{3}$ in head from snout tip, jaw edges firm, moderately trenchant and lips narrow, lower jaw well protruded, interorbital $3\frac{1}{2}$ to $3\frac{3}{4}$, convex, suborbital broad, invades $\frac{1}{3}$ of cheek to preopercle ridge Gill rakers 7 + 23, lanceolate, $\frac{4}{5}$ of gill filaments, which $1\frac{1}{3}$ in eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, small, hooked moderately and larger with moderate, entire grinding surfaces

Scales *21 to 25 (10 to 14 overlap) + 36 to 40 + 4 to 6 in lateral line, 15* above, 7 below to ventral origin, 9 below to anal origin, 55 to 58 predorsal Scales of belly not crossing median abdominal keel Pectoral axil with small, pointed, cutaneous flap, its free portion slightly longer than scale exposure Axillary ventral scale $\frac{1}{3}$ of fin Caudal base well scaled Lateral line complete, strongly decurved anteriorly, low along side of tail and finally median at caudal base, tubes simple, all small, short and slightly decurved Scales with 5 to 10 radiating apical striae, fine basal circuli not extended, or only obsolete apically

D III, 7, I, first branched ray $1\frac{1}{2}$ to $1\frac{5}{8}$ in total head length, A III, 21, I to III, 23, I, first branched ray $1\frac{1}{3}$ to 2, caudal $2\frac{4}{5}$ to 3 in rest of fish, upper lobe shorter or $1\frac{1}{6}$ in lower, least depth of caudal peduncle $2\frac{2}{3}$ to 3 in total head length, pectoral 1 to $1\frac{1}{10}$, rays I, 14, ventral rays I, 8 fin $1\frac{4}{5}$ to 2 in total head length Vent close before anal

When fresh in alcohol pale brown above, greater lower portions bright silvery white, especially side of head and abdomen Iris silvery white Fins all pale to whitish *Base of anal and most of caudal base* yellowish, and hind edge of latter narrowly dark gray Later in alcohol an underlaid grayish axial band borders an underlaid coppery or dull golden band or streak all along its upper edge

Seven, 109 to 178 mm, Bangkok

Culter wolfi, new species Figure 101 (type)

Depth 4 to $4\frac{1}{2}$, trenchant abdominal keel well developed, head $3\frac{1}{2}$ to 4, width $2\frac{1}{8}$ to $2\frac{3}{4}$ Snout $3\frac{7}{8}$ to $4\frac{1}{4}$ in head from snout tip, eye $3\frac{1}{4}$ to $4\frac{2}{3}$, greater than snout in young to $1\frac{1}{10}$ in snout with age, maxillary very oblique, reaches opposite front eye edge though well below level of its lower edge, length $2\frac{5}{8}$ to $2\frac{7}{8}$ in head from snout tip, lips narrow, thin and mandible well protruded in front so end of symphysis with age above level of upper eye edge, jaw edges not very trenchant, interorbital $3\frac{1}{3}$ to $4\frac{1}{8}$ in head from snout tip, convex, suborbitals broad, invade cheek $\frac{4}{5}$ to preopercle ridge Gill rakers 6 + 26, finely lanceolate, subequal with gill filaments, which $1\frac{3}{4}$ in eye Pharyngeal teeth 1, 3, 5 — 5, 3, 1, larger ones hooked and with moderate, smooth, entire, grinding surfaces.

Scales 23 to 25 (overlap 5 to 10, and sometimes auxiliary median series of 8 scales may be interposed) + 53 to 55 + 7 to 9 in lateral line; 15 above, 5 below to ventral origin, 6 below to anal origin, 55 to 60 predorsal scales forward until opposite hind eye edge. Pectoral with adnate pointed cutaneous axillary papilla 5⅗ in depressed fin Ventral axillary scale 3¼ in fin Lateral line well decurved, low along side of tail and reaches caudal base medially, tubes short, simple small, slope downward Scales with 3 or 4 apical radiating striae and 1 to 6 incomplete marginal auxiliaries, 2 basal radiating striae with 1 or 2 marginal auxiliaries, circuli fine, basal

D III, 7, I, first branched ray 1⅗ to 1⅘ in total head length, A III, 22, I, or III, 23, I, first branched ray 1⅗ to 1½, caudal equals head, upper lobe 1⅛ to 1⅓ in lower lobe, least depth of caudal peduncle 3 to 3⅛ in total head length, ventral 1⅔ to 1⅞, rays I, 8, pectoral rays I, 13, fin 3⅝ to 3⅞ in fish without caudal Vent close before anal

Back and upper surface of head brownish, sides and below with more or less pale to rather brilliant copper color Sides of head and abdomen more or less whitish or with silvery tints Iris whitish Fins pale, with more or less yellowish tint and hind edge of caudal rather narrowly dark gray

A N S P, No 68,016 Pitsanulok, Siam Length 205 mm Type Also Nos 68,017 to 68,020, same data, paratypes Length 123 to 185 mm

Closely related to *Culter siamensis*, differing in the always distinctly longer pectoral, well exceeding the length of the head Three, 69 to 85 mm, Me Poon

(For the late Herman T Wolf of Philadelphia, aquarium student, who obtained numerous American fishes for the Academy)

Culter barroni (Fowler)

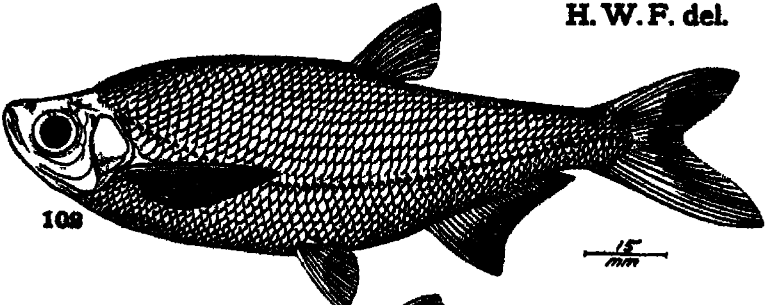
Thirteen, 133 to 150 mm, Pitsanulok, 66 specimens, 56 to 97 mm., Kemrat The former all with more or less coppery tints Lower sides of head and ¾ of body silvery white. Variable obscure dark gray saddle on front of predorsal, often narrow, again wide as eye, and others less distinct, may be present posteriorly Fins all pale, caudal with yellowish line basally

In Kemrat specimens caudal yellowish basally, marginally gray Iris gray, doubtless silvery white in life

Culter typus (Bleeker). Figure 102 (Bangkok)

Eighteen, 122 to 155 mm Bangkok Depth 2⅘ to 3⅛, eye 2⅝ to 2⅞ in head from snout tip Scales 48 (10 to 20 overlap) + 3 in lateral line A III, 27, I, to III, 29, I Pectoral not reaching ventral Pale brown, with yellowish to coppery tinge Lower side of body silvery white Iris white. Anal and caudal bases yellowish, hind edge of latter dark gray Paired fins cream white

Ten, 110 to 136 mm., Pitsanulok All more or less coppery brown, with whitish shades below. Iris white or pink, evidently turning gray Ill defined axial lateral band from head to caudal base, most distinct along



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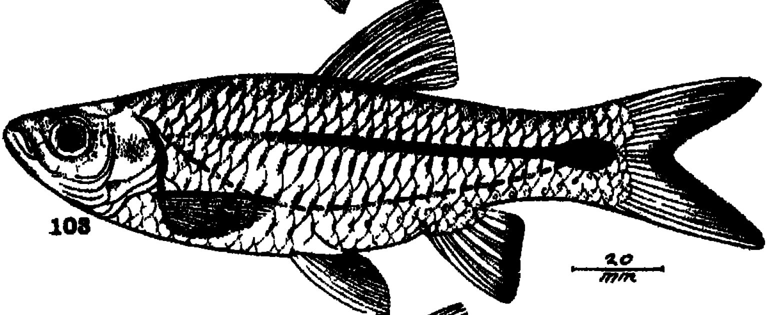

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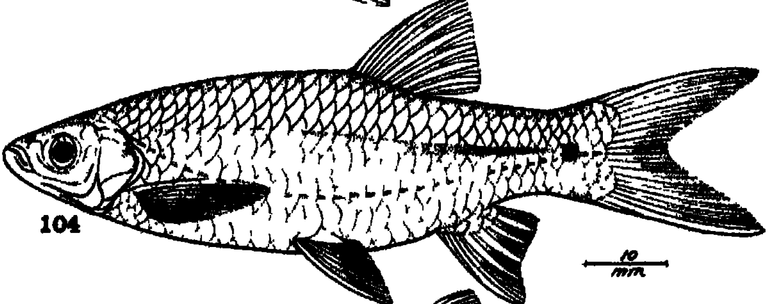

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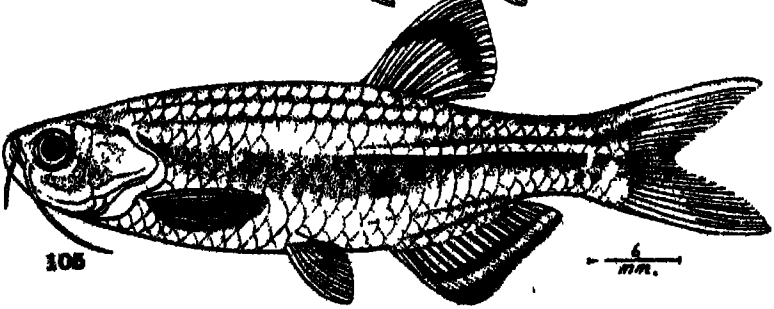


105

102 *Culter typus* 103 *Rasbora cromiei*
104 *Rasbora cheroni* 105 *Danio pulcher.*

side of tail Caudal yellowish, hind edge gray Other fins pale brown, with dark dots on middle of pectoral, often inconspicuous

All my specimens when freshly received were brilliant brassy-white, with silvery reflections over the whole lower side of head from level with upper edge of eye Above the back pale or light brown, with brassy tint Most specimens showed only a few inconspicuous dark or scattered dots, on the upper pectoral rays In formaline iris and opercle turn dark gray and fins nearly colorless Lateral line usually incomplete, though often forked at its lowest part of bend, this variable and may or may not occur on one or both sides of the same specimen

Culter stigmabrachium (Fowler)

Two, 78 to 105 mm, Bangkok, sixteen, 115 to 148 mm, Me Poon, one, 43 mm, Taclin, seven, 106 to 142 mm, Kemrat Me Poon materials all show a more or less pale brown body, with an obscurely defined, underlaid, dull gamboge lateral band, most distinct axially along side of tail Most of fins pale to whitish Caudal yellowish, hind edge dark gray. Pectoral with distinct contrasted blackish blotch, made up of blackish dots and equally distinct on both sides of fin Iris whitish, now turned gray

Culter riveroi Fowler

Depth 3⅘ to 3⅔, head 4 to 4⅜, width 2 to 2¼ Snout 4½ to 5 in head from snout tip, eye 3⅓ to 3⅘, greater than snout, greater than interorbital in young to subequal with age, maxillary very oblique, not quite reaching opposite front eye edge and not below lower eye edge, length 3⅒ to 3⅜ in head from snout tip, lips rather thin, narrow, jaw edges little trenchant, interorbital 3¼ to 3½, rather low, convex, suborbitals cover most of cheek to preopercle ridge Gill rakers 10 + 33, finely lanceolate, equal gill filaments or 2 in eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, hooked, with moderate, entire, grinding surfaces

Scales 50 to 52 + 4 or 5 in lateral line, 12 above, 5 below to ventral base, 6 below to anal origin, 47 to 59 predorsal scales forward opposite hind eye edge Pectoral axillary scale 4¼ in fin Ventral axillary scale 3⅘ in fin Caudal base broadly scaly Two rows of small basal scales on anal. Lateral line complete, distinct, well decurved, runs along lower side of tail up to middle of caudal basally, tubes all small, short, each directed downward Scales with 3 to 6 apical radiating striae, none or 1 basal radiating stria, circuli fine, basal, obsolete apically

D ii, 7, i, first branched ray 1¼ to 1⅓ in total head length, A iii, 21, i to iii, 25, i, first branched ray 1⅘ to 1⅔, caudal 3⅓ to 3⅘ in rest of fish, deeply forked, upper lobe 1⅛ in lower, least depth of caudal peduncle 2½ to 2¾ in total head length, pectoral 3¼ to 3⅓ in fish without caudal, rays i, 14, ventral rays i, 8, fin 1⅞ to 1⅜ in total head length Vent close before anal, with small fleshy papilla

Brown, with coppery reflections, lower sides and under surfaces whitish Iris white, also lower side of head. Fins pale brown or dull pink Caudal sometimes with gray basally and hind border dark gray

Nine, 123 to 150 mm , Pitsanulok, five, 65 to 140 mm , Me Poon Only known previously from the type, which agrees in every way with the above

Oxygaster oxygastroides (Bleeker)

Three, 40 to 48 mm , Me Poon, 100 specimens, 50 to 138 mm , Bangkok Depth 3⅛ to 3⅓ When fresh very pale brown, with slight yellowish tinge below Sides of head and iris largely silvery white Broad silvery white band, wide as eye, along side of body axially, narrowing on caudal peduncle Silvery white reflections also on lower side of body Dorsal and caudal little grayish terminally, and gray dots on pectoral above variously obscured Caudal usually tinged yellowish basally Fins otherwise pale to whitish In formaline eyes and opercle turn dark gray or leaden, and dark gray lateral streak forms along side of tail, bounding upper edge of silvery lateral band

Me Poon materials differ from most all my large examples in having the dorsal origin well behind the anal origin

Macrochirichthys macrochirus (Valenciennes)

One, 240 mm , Me Poon, two, 158 to 192 mm , Kemrat Comparison of this material, representative of two distinct river basins fails to show any differences other than age or individual variation

RASBORINAE

Rasbora cromiei, new species Figure 103 (type)

Depth 3¼ to 3½, head 3⅜ to 3½ width 1⅜ to 2 Snout 3⅞ to 4 in head from snout tip, eye 3¼ to 4, greater than eye in young to subequal with age, 1⅓ to 1⅜ in interorbital, maxillary not quite reaching opposite front eye edge, length 2⅗ to 3 in head from snout tip, mandible slightly protruded, symphysis with rounded knob fitting in depression at front of snout or upper jaw, no barbels, interorbital 2⅜ to 2⅘, convex, suborbitals broad, largely cover cheek to preopercle ridge Gill rakers 2 + 11, lanceolate, ½ of gill filaments, which ⅜ of eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, hooked and larger with well developed, entire grinding surfaces

Scales 25 to 28 + 3 in lateral line, 5 above, 2 below to ventral origin, 3 below to anal origin; 12 or 13 predorsal Axillary pointed pectoral scale ⅓ of fin Ventral with axillary scale 2⅖ in fin. Caudal base scaled Anal base with row of large scales Lateral line complete, continuous, well decurved, low along side of tail to median at caudal base, tubes long, slender, simple, well exposed Scales with 17 to 24 apical radiating striae, variably incomplete or marginal; 21 to 24 more or less parallel basal striae, circuli fine, basal finer, apically convergent

D ɪɪ, 7, ɪ, first branched ray 1⅕ to 1¼ in total head length, A ɪɪɪ, 5, ɪ, first branched ray 1⅞ to 1⅘; caudal 2½ to 2⅗ in rest of fish, deeply forked, least depth of caudal peduncle 2 to 2⅖ in total head length, pectoral 1¼ to 1⅖, rays ɪ, 12; ventral rays ɪ. 8, fin 1⅓ to 1⅜ in total head length Vent close before anal origin.

Back and upper surfaces umber, paler on lower sides and below, evidently white in life Iris grayish. Mandible and lower lip pale, chin and median symphyseal region darker brown Dark inclined bar along hind edge of shoulder girdle Axial dark gray to black lateral band from behind head to middle of caudal base, narrow and pale at first it expands at caudal base as elongated lobe, its vertical diameter less than eye Dorsal and caudal gray brown, former with each ray medially with slightly darker bar Lower fins pale or dull, soiled brownish

A N S.P , No. 68,021 Me Poon, Siam. Length 89 mm Type Also Nos 68,022 to 68,046, paratypes, same data Length 33 to 102 mm Besides the above 75 others, 31 to 100 mm , Me Poon, 77 specimens, 51 to 77 mm , Rayong

Apparently closely related to *Rasbora borapetensis* H. M Smith, 1934, from Bung Borapet, central Siam It is described from an example but 48 mm. long, and ' readily recognizable by the incomplete lateral line (which never extends beyond the anal fin) " It is also described with a black lateral band, narrower than the eye extending from gill opening to base of caudal fin

The imperfectly described *Rasbora paviana* Tirant 1883 seems to differ largely in coloration It is described with an oblique black bar dividing the back at the top of the head and descends obliquely back along the flank and the breast, level with the first third of the pectoral

(For Mr George H Cromie, of Atlantic City, N J , who has secured many rare or interesting local fishes for me)

Rasbora cheroni, new species Figure 104

Depth 3, head 4, width 2 Snout 3⅔ in head from snout tip, eye 3¼, 1½ in interorbital, maxillary not quite reaching opposite front eye edge, length 3⅗ in head from snout tip; mandible well protruded in front, with broad symphyseal knob, received in depression at end of snout, lips thin, narrow, interorbital 2⅓ in head from snout tip, convex, broad suborbitals largely cover cheek Gill rakers 4 + 10, lanceolate, ⅗ of gill filaments, which ½ of eye Right pharyngeal teeth 5, 3, 2, hooked, with moderate, entire grinding surfaces

Scales 30 + 2 in lateral line, 5 above, 1 below to ventral origin, 2 below to anal origin, 14 predorsal forward opposite hind preopercle edge. Axillary pectoral scale ⅓ of fin Axillary ventral scale 2¼ in fin Anal with basal row of large scales Caudal base broadly scaly Lateral line complete, distinct, decurved, low along side of caudal peduncle then up till median on caudal basally Scales with 31 apical radiating striae of which many incomplete, 12 close-set basal radiating striae, circuli basally fine and numerous, apically less so and convergent to obsolete

D ii, 6, i, first branched ray 1⅗ in head from snout tip; A. iii, 5, i, first ray 1¼, caudal 2⅗ in rest of fish, deeply forked, least depth of caudal peduncle 1⅘, pectoral 1 in total head length, rays i, 11, ventral rays i, 8, fin 1⅗ in total head length.

Back pale brown, under surfaces scarcely lighter Iris whitish. Narrow dark gray vertebral line axial on side of body, faint at first and darker posteriorly or along side of tail Small round black spot, less than pupil, at middle of caudal base Fins all pale, hind edge of caudal grayish

U S N M , No 68,011 Pitsanulok, Siam Length 97 mm Type

Known by its deep body, postmedian insertion of the dorsal and small, round, black basal caudal spot

(For Peter Cheron, who assisted in forming the collection of Siamese fishes)

Rasbora argyrotaenia (Bleeker)

Fifty, 46 to 145 mm , Bangkok, one 48 mm , Tachin, two, 25 to 27 mm , Me Poon, sixty, 51 to 104 mm , Kemrat

Danio pulcher H M Smith Figure 105

Depth 3⅜ to 3½, head 3½ to 3¾, width 1⅗ to 1¼ Snout 5 to 6 in head from snout tip, eye 3½ to 4½, greater than snout, 1⅓ to 1⅔ in interorbital, maxillary reaching eye, length 3¼ to 3½ in head from snout tip, jaw edges blunt, not trenchant, mandible well protruding in front, rostral barbel reaches well beyond eye or 1½ to 2 in rest of head, maxillary barbel reaches pectoral origin or ⅓ in pectoral fin, interorbital 2⅓ to 2⅔ in head, broadly convex, suborbitals broad, cover cheek Gill rakers 2 + 10, short, feeble points, ⅓ of gill filaments, which 2 in eye Pharyngeal teeth 1, 3, 5 — 5, 3, 2, hooked, with oblique, entire grinding surfaces

Scales 27 to 29 + 2 in lateral line course, with only 5 tubes anteriorly from shoulder girdle, 8 scales transversely, 12 to 14 predorsal Paired fins each with pointed axillary scale Caudal base scaly and row of 10 basal anal scales Scales with 21 to 34 apical, close set, parallel striae, basal circuli fine, close set, not extending apically

D III, 7, I, first branched ray 1⅓ to 1¼ in total head length, A III, 14, I or III, 15, I, first branched ray 1⅓ to 1⅔, caudal 3 to 3¼ in rest of fish, deeply forked, lobes equal, least depth of caudal peduncle 2⅜ to 2½ in total head length, pectoral 1⅙ to 1⅓, rays I, 11 or 12, ventral I, 6, fin 1⅔ to 1⅞ in total head length.

Back and upper surface olive brown, lower or under surfaces paler to whitish Iris pale to whitish Dark median band down back. On each side of back 2 longitudinal dark streaks more or less obscured Diffuse median broad dark band from behind head to caudal and along its upper border which becomes dark to blackish brown Above last a pale or light streak, which narrowed forward and also bounded by a dark brown band along its upper edge. Two very obscure slightly dark streaks above anal, converging behind. Dorsal and caudal brownish, former with submarginal crescent of dark brown, and 2 dark bands on anal as one marginal and one submarginal

Three, 29 to 40 mm., Pitsanulok; 166 specimens, 28 to 50 mm , Me Poon Besides these are the specimens I reported as *Danio albolineata* (Blyth) in 1934 from Chantaboon. Smith's account of his *D pulcher* in 1931 shows some points of difference as " eye situated low on side of head, 3 in head, lower jaw slightly projecting, rostral barbel 0.5 maxillary barbel . . reaching far beyond base of pectoral, lateral line entirely absent, pectorals nearly reaching ventrals "

Esomus metallicus Ahl

Two, 52 to 56 mm , Rayong Scales 27 + 3 in lateral line, 15 predorsal scales *Hora and Mukerji's figure shows scales 32 + 2 in lateral line*

Esomus goddardi, new species Figure 106 (Me Poon)

Depth 3⅜ to 4, head 3½ to 3¾, width 2 to 2⅛ Snout 4 to 4½ in head, from snout tip, eye 3¾ to 4¼ greater than snout, 1¼ to 1½ in interorbital, maxillary reaches ¾ to eye, length 3⅜ to 4 in head from snout tip, mouth broad, jaw edges rather trenchant, lips thin and narrow and mandible protruding in front, rostral barbel reaches behind hind eye edge half to nearly entire eye diameter, maxillary barbel to front of anal or middle of anal base, interorbital 3 to 3¼ in head from snout tip, low, depressed, suborbitals broad, cover cheek to preopercle ridge Gill opening extends forward opposite hind pupil edge Gill rakers 4 + 18, flexible, tentacular, slender, ½ of gill filaments, which 1⅓ in eye Pharyngeal teeth 4 — 5, pointed, simple, each with entire, broad grinding surfaces

Scales 25 or 26 + 4 or 5 in course of lateral line and only 11 or 12 of scales tubular or extending to above ventral origin, 8 scales transversely above anal origin, 17 or 18 predorsal forward until opposite hind preopercle edge Ventral with rather long axillary scale, 2 to 2½ in head Caudal broadly scaled basally Anal with single row of basal scales Scales with 13 or 14 apical radiating striae, 4 to 8 basal variable striae, circuli fine basally, converging and fewer apically

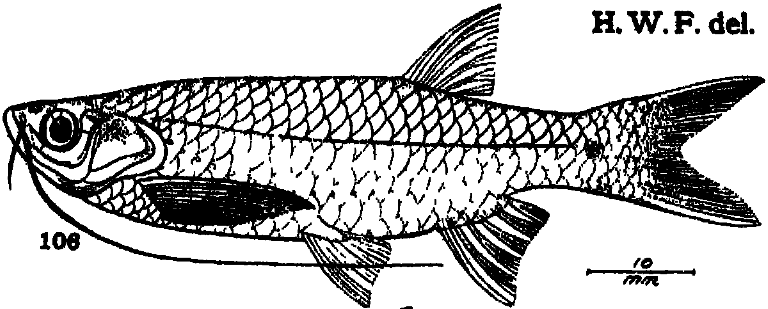
D iii, 5, i, or iii, 6, i, first branched ray 1⅜ to 1½ in total head length, A iii, 5, i, first branched ray 1½ to 1⅝, caudal 2⅝ to 3⅛ in rest of fish, deeply forked, slender lobes sharply pointed, least depth of caudal peduncle 2¼ to 2⅝ in total head length, pectoral reaches little beyond ventral base, length 2⅝ to 3⅛ in fish without caudal, rays i, 12, ventral rays i, 7, fin 1½ to 1¾ in total head length Vent close before anal fin

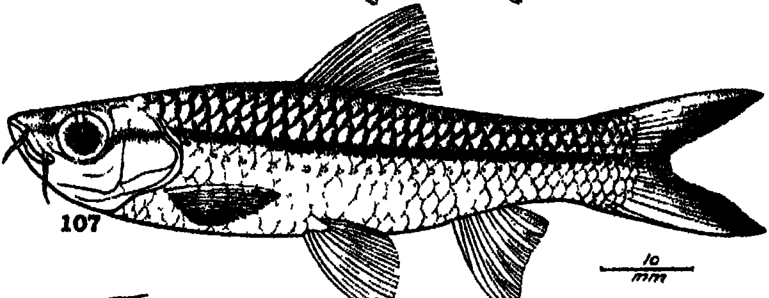
Pale brown, little lighter below Sides of head and body with silvery white reflections Narrow dark gray axial line along side of body, most distinct on tail Iris white Barbels pale brownish Fins all pale to whitish

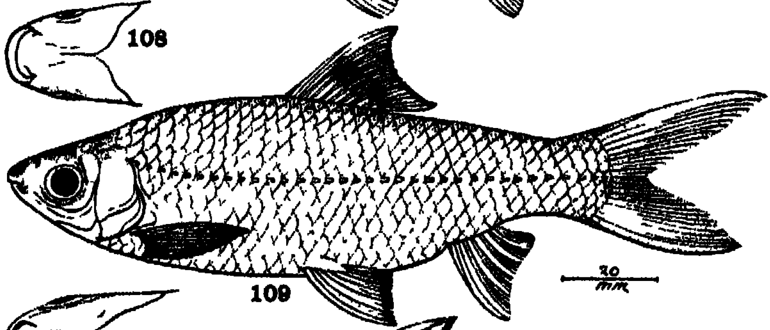
A N S P , No 68,047 Me Poon, Siam Length 73 mm Type Also Nos. 68,048 to 68,067, paratypes, same data Length 42 to 84 mm Other materials, 540 specimens, 27 to 78 mm , Me Poon, 47 specimens, 30 to 78 mm , Pitsanulok, one, 42 mm , Tachin, eleven, 48 to 64 mm , Bangkok; two, 39 to 50 mm , Kemrat

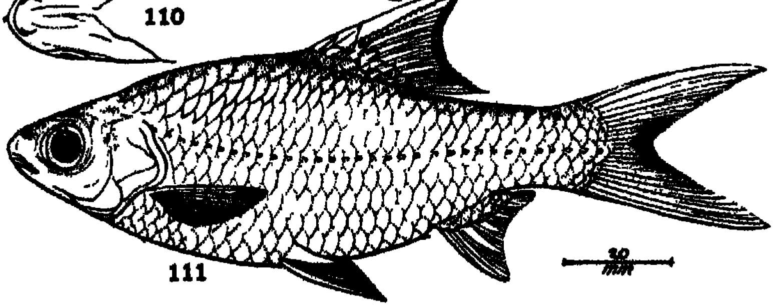
Distinguished by its long rostral barbel extending well behind the eye, when laid back The incomplete lateral line reaches above the ventral, usually far as anal The uniform coloration is only varied by a diffuse silvery-white lateral band on the body, in which an obscure dark gray vertebral line traverses it and is distinct largely or only on the tail It

H. W. F. del.









106 *Esomus goddardi.* 107 *Filirasbora rubripinna*
108, 109 *Cirrhinus marginipinnis* 110, 111 *Xenocheilichthys gudgeri*

differs from *Esomus metallicus* Ahl (1923, noticed by Hora and Mukerji 1928), in the longer rostral barbel, which always extends well behind the eye, and the narrow dark axial line, not band-like

(For Paul B Goddard, an early donor to the collection of fishes of the Academy)

FILIRASBORA, new genus

Body elongate, well compressed, body edges rounded. Head robust, moderately large, depressed above and constricted below Snout short, broad, obtuse Eye large, advanced, high, rounded Maxillary well inclined, not reaching below eye Mandible included in upper jaw Pair of maxillary and pair of rostral barbels Interorbital broad, flat Suborbitals very narrow Nostrils well developed, anterior with flap, posterior much larger Gill opening connected as free membrane over isthmus, incision extending forward not quite opposite hind eye edge Gill rakers short points Pseudobranchiae well developed Pharyngeal teeth moderate, triserial Scales large, in even longitudinal series, narrowly imbricated, present on breast and caudal base Lateral line present, complete Dorsal origin median between snout tip and caudal base, little before ventral origin Anal small, well behind dorsal Caudal large, forked Caudal peduncle moderate, well compressed Pectoral low, not reaching ventral Ventral moderate, not reaching anal Type *Filirasbora rubripinna*, new species

Known chiefly by the presence of two pairs of barbels, in combination with other characters, such as the slightly longer upper jaw, narrow suborbitals, advanced dorsal, etc

(*Filum* thread + *Rasbora*, with reference to the barbels)

Filirasbora rubripinna, new species Figure 107

Depth 3⅘, head 3¼, width 1⅞ Snout 3¾ in head, eye 3¾, 1½ in interorbital, maxillary not quite reaching opposite front eye edge, length 3 in head, jaw edges little trenchant, with narrow, thin lips; interorbital 2¼, very broad, nearly level or only slightly convex, suborbitals narrow, only cover about ¼ of cheek to preopercle ridge Gill rakers 4 + 10, short, about ¾ of gill filaments, which 2 in eye Right pharyngeal teeth 5, 3, 1, larger ones without hooks, all with more or less broad, entire grinding surfaces.

Scales 28 + 4 in lateral line, 5 above, 2 below to ventral origin, 3 below to anal origin, 9 predorsal forward opposite hind preopercle edge. Paired fins with small scales in axil Breast and caudal fin scaled. Lateral line well decurved, extends upward along side of tail to caudal base medianly Scales with 28 apical radiating striae, 15 short basal radiating striae, circuli fine and close set basally, apically converging and more wide set

D iii, 8, i, first branched ray 1¼ in head, A ii, 5, i, first branched ray 1⅔, caudal 3¼ in rest of fish, deeply forked and lobes slender and sharply pointed, least depth of caudal peduncle 2¼ in head; pectoral 1½, rays i, 14; ventral rays i, 8, fin 1⅔ in head

Brown, paler below, evidently silvery white in life. Dark median streak down back. Each scale on back with slightly darker border or margin Dorsal and caudal brownish, latter with ends of lobes dark, lower black Other fins pale to whitish, with slight brown tinge on anal. Vent close before anal.

A N S P, No 68,068 Kemrat, Siam Length 85 mm Type

Characters largely in the generic account. When freshly received the type had the lower fins, including the caudal and pectoral all more or less bright orange red

(*Ruber* red + *pinna* fin)

Luciosoma harmandi Sauvage

Four, 142 to 153 mm, Kemrat, one, 168 mm, Pitsanulok

CYPRININAE

Cyprinus carpio Linnaeus

One, 239 mm, Bangkok

Cirrhinus jullieni Sauvage

Eight, 53 to 109 mm, Bangkok, 158 specimens, 32 to 180 mm, Me Poon, 21 specimens, 58 to 163 mm, Kemrat, nine, 42 to 49 mm, Pitsanulok Sides of head below, also iris and most of lower surfaces bright silvery white Barbels may be present on maxillary, one or both, small, very variable, and concealed Distinguished from the following by its uniformly white ventrals

Cirrhinus marginipinnis, new species Figures 108 (head below), 109

Depth 2⅔ to 3⅓, head 3¾ to 4, width 1½ to 1⅞ Snout 3¼ to 5 in head, eye 4 to 4⅗, 1 to 1½ in snout, 2 to 2⅓ in interorbital, maxillary extends ⅔ to eye, length 4¼ to 4⅗ in head, mouth broadly obtuse as viewed from below, jaw edges firmly trenchant, and lower included in upper, no barbels, lips smooth, upper narrow, lower well forward on jaw though leaving broad entire symphyseal area, interorbital 2 to 2⅓ in head, broadly convex, suborbitals broad, invade ⅔ of cheek to preopercle ridge Gill membranes joined to isthmus, extend forward opposite hind edge of eye Gill rakers 5 + 40, short, feeble, slender points, about $\frac{1}{10}$ of gill filaments, which long as eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, close set, compressed, compact, all with bevelled, entire, well developed grinding surfaces, forming even triturating area

Scales 30 to 32 + 2 in lateral line, 6 above, 5 below to ventral origin, 5 below to anal origin, 13 or 14 predorsal scales. Axillary ventral scale 2⅓ to 2⅗ in fin Caudal base scaled Lateral line complete, straight, axial, along side of body; tubes simple, small, little exposed Scales with 10 to 12 apical radiating striae and as many more incomplete, marginal ones variously imperfect, 6 basal radiating striae, circuli fine basally, divergent and fewer apically

D iii, 8, i, first branched ray $1\frac{1}{10}$ to 1⅓ in head, A. iii, 5, i, first branched ray 1⅗ to 1⅘; caudal 2⅘ to 3⅓ in rest of fish, lobes slender, lower often shorter and fin deeply forked, least depth of caudal peduncle 1⅞ to 2⅛ in head, pectoral 1⅛ to 1⅓, rays i, 17; ventral rays i, 8, fin 1¼ to 1⅓ in head. Vent close before anal

Back and upper surface of head olive brown, lower sides and below pale to whitish. Side of head with silvery white reflections Iris white Jaws pale Dorsal pale brown, upper edge usually darker, and each membrane close before front edge of fin ray with blackish gray streak medially Caudal pale brownish, upper and lower edges shaded broadly little darker Lower fins all pale to whitish, with distinct and contrasted margin of ventral terminally dark brown

A N S.P , No 68,069 Pitsanulok, Siam Length 153 mm Type Also Nos 68,070 to 68,083 same data, paratypes. Length 107 to 170 mm Other materials, 134 more specimens from same locality, and within same dimensions, 17 specimens, 65 to 159 mm , Bangkok, 44 specimens, 42 to 153 mm , Me Poon

Always distinguished from *Cirrhinus jullieni* by its ventrals terminally edged dark gray to dusky

(*Margo* border + *pinna* fin)

Leptobarbus hoevenii (Bleeker)

Three, 180 to 220 mm , Bangkok Ventrals intense and greatly contrasted vermilion in freshly received materials The inner edge of eyeball orange and a flush of rose on the top of the head Opercles rich gamboge or golden, with gray black blotch posteriorly All scales above lateral line in contrast with blackish margins Dorsal, anal and caudal dark gray, pectoral yellowish

Amblyrhynchichthys truncatus (Bleeker)

Eleven, 130 to 148 mm , Bangkok, one, 153 mm , Me Poon, one, 162 mm., Kemrat

Albulichthys albuloides (Bleeker)

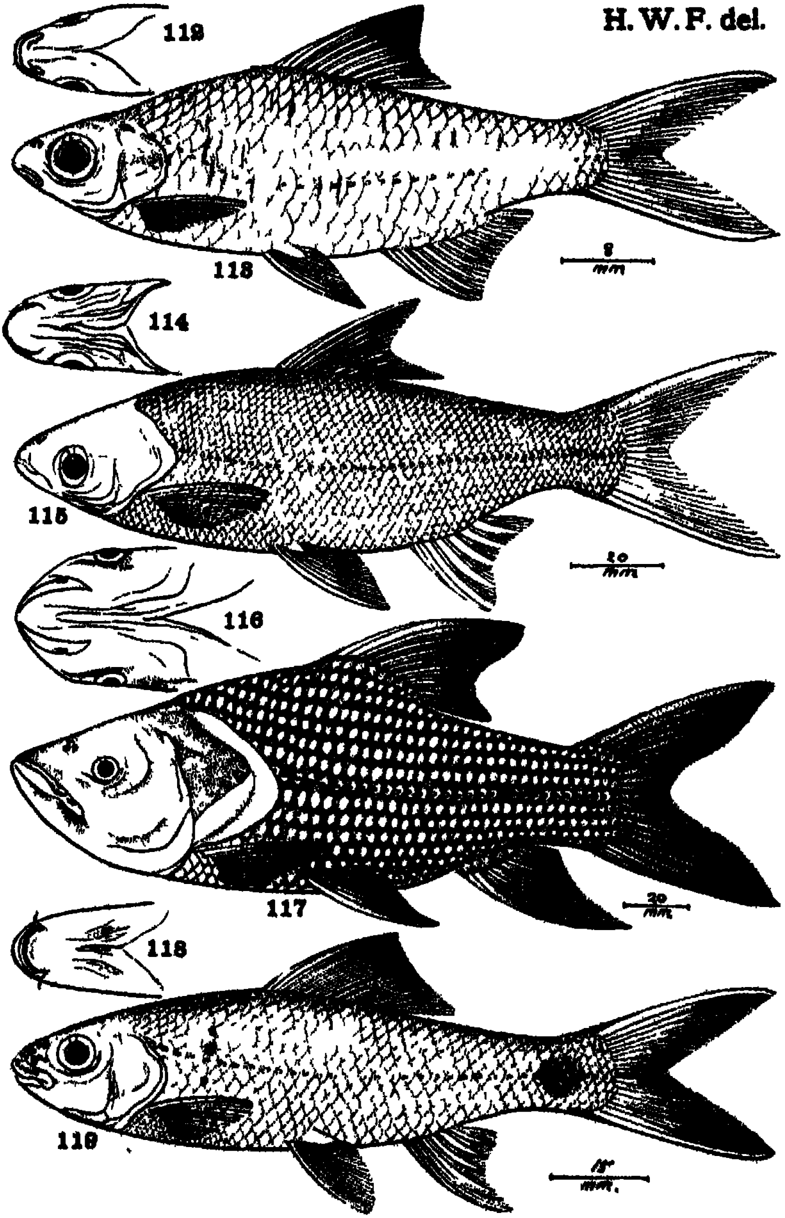
One, 174 mm , Bangkok

Xenocheilichthys gudgeri H M Smith. Figures 110 (head below), 111

Depth 2½, head 3⅗, width 1⅔ Snout 4⅗ in head, eye 3¼, greater than snout, 1⅓ in interorbital, maxillary reaches to eye, length 4 in head, mouth width less than eye, mandible inferior, edge more trenchant than upper jaw edge, with short lateral cleft, interorbital 2⅗ in head, broadly convex, suborbitals narrow, barely invading ¼ of cheek to preopercle ridge Gill opening extends forward opposite hind eye edge Gill rakers 6 + 30, short, compressed, close set, triangular points, 2½ in gill filaments, which 2 in eye Right pharyngeal teeth 4, 3, 1, or outer row only one tooth hooked and without grinding surface; all others large, without hooks and with broad oblique, entire grinding surfaces.

Scales 28 + 3 in lateral line, 5 above, 4 below to ventral, 4 below to anal, 10 predorsal. Ventral with long axillary scale, half length of fin. Dorsal, anal and caudal bases scaly. Lateral line complete, axial along side of body, tubes moderate, simple, exposure short Scales with 27 apical striae, of which 5 to 7 completely radiating; 6 or 7 basal, of which 2 or 3 completely radiating, circuli fine basally, obsolete apically

D. IV, 8, I, last simple ray robust, osseous, hind edge with about 18 antrorse denticles, length 1 in head; A. III, 5, I, third simple ray 2; caudal



112, 113. *Mystacoleucus atridorsalis.* 114, 115. *Thynnichthys thai*
116, 117 *Catlocarpio siamensis* 118, 119. *Osteochilus tatumi*

$2\frac{1}{3}$ in rest of fish, deeply forked, lobes slenderly angular, least depth of caudal peduncle 2 in head, pectoral $1\frac{2}{3}$, rays I, 13, ventral rays I, 8, fin $1\frac{2}{3}$ *in head* Vent close before anal fin, with small conic papilla

Back and upper surface of head dull olive, sides and below pale to whitish *Iris gray, evidently* whitish *in life Jaws and lower part of* muzzle pale Fins pale, hind edge of dorsal and caudal narrowly dark gray

One, 145 mm , Kemrat

Mystacoleucus chilopterus Fowler

Six, 28 to 65 mm , Me Poon

Mystacoleucus atridorsalis, new species Figures 112 (head below), 113

Depth $2\frac{3}{5}$ to 3, head $3\frac{3}{5}$ to $3\frac{4}{5}$, width $1\frac{7}{8}$ Snout $4\frac{1}{8}$ to $4\frac{1}{4}$ in head, eye $3\frac{1}{8}$ to $3\frac{1}{3}$, greater than snout, subequal with interorbital, maxillary not quite reaching opposite front eye edge, length $3\frac{1}{2}$ to 4 in head, jaws firm, edges not trenchant, obtuse, lower included in upper, lips narrow, lower short, interorbital $2\frac{3}{4}$ to $2\frac{4}{5}$, convex, suborbitals narrow, invade about $\frac{4}{5}$ of cheek to preopercle ridge Gill rakers 4 + 12, short, lanceolate, $\frac{1}{4}$ of gill filaments, which $1\frac{3}{4}$ in eye Pharyngeal teeth 2, 4, 4 — 4, 2, 2, hooked, with moderate, entire, grinding surfaces

Scales 28 or 29 + 3 in lateral line, 6 above, 3 below to ventral origin, 4 below to anal origin, 8 or 9 predorsal Axillary ventral scale $2\frac{3}{5}$ in fin Caudal base scaly and anal with basal row of scales Lateral line complete, decurved, becomes median at caudal base, tubes slender, simple, moderately exposed Scales with 9 apical radiating striae, basal circuli fine, obsolete apically

D III, 8, I, front simple rays pungent though not osseous, entire, first branched ray $1\frac{1}{10}$ in head, A III, 10, I, first branched ray $1\frac{3}{5}$ to $1\frac{3}{4}$, caudal $2\frac{1}{2}$ to $2\frac{3}{5}$ in rest of fish, deeply forked, lobes slenderly pointed, least depth of caudal peduncle 2 to $2\frac{1}{8}$ in head, pectoral $1\frac{1}{4}$, rays I, 16, ventral rays I, 8, fin $1\frac{1}{8}$ to $1\frac{1}{4}$ in head. Vent close before anal fin

Pale brown, each scale on back with slightly darker median blotch so margins pale On side of body imperfect or obscured short dark vertical streaks Underlaid pale streak axial along side of tail Iris gray, evidently whitish in life Fins all pale to whitish, except contrasted jet black apex broadly on dorsal

A N S P , No 68,084 Kemrat, Siam Length 67 mm Type Also No 68,085, same data, paratype. Length 66 mm

Differs from the known species of its genus in the striking jet black summit of its dorsal fin

(*Ater* black + *dorsum* back, with reference to the dorsal fin)

Mystacoleucas marginatus (Valenciennes)

Eleven, 48 to 128 mm , Kemrat, 155 specimens, 33 to 147 mm , Me Poon

Dangila leptocheila Valenciennes

Three, 117 to 170 mm., Pitsanulok Depth 3; head $4\frac{1}{4}$ to $4\frac{3}{5}$ Maxillary barbel $2\frac{1}{4}$ times eye, rostral barbel equals eye Scales 35 + 4 in lateral line, 6 below to ventral origin D iii, 25, i or iii, 26, i Large specimen without any trace of dark ring or blotch on lateral line over pectoral

Dangila siamensis Sauvage

Twenty, 98 to 260 mm, Bangkok, thirty, 48 to 82 mm, Me Poon, two, 57 to 74 mm, Pitsanulok, twenty-two, 68 to 158 mm, Kemrat Depth 3 to 3⅗ Upper lip with 6 to 8 distinct papillae Lower lip along base of smooth trenchant, coriaceous jaw edge densely and finely papillose Pearl organs present in smallest as well as in largest specimens They form a band of 2 or 3 series around end of snout, as 6 or 7 in upper row, 4 or 5 in median row and a lower or imperfect row of 3 or 4, which usually smaller than the others Scales 31 to 34 + 2 or 3 in lateral line, 7 above, 4 below to ventral, 5 below to anal D iii, 21, i to iii, 23, i

Several details in the original account by Sauvage based on Petschaburi and Bangkok specimens 170 mm long, do not altogether agree as he gives the snout with the pores arranged in a single line (these evidently pearl organs) and upper lip not fringed

No mention is made of the dark spots over the pectoral on the lateral line as figured and described by Smith for his *Dangila spilopleura* As these have largely faded out in many of my examples, likewise the dark blotch at the caudal base, I feel they were likely overlooked by Sauvage This is also apparently true of the paired fins and anal, which were brilliant vermilion in fresh specimens, though now entirely faded whitish or light gray Altogether Smith has admitted six Siamese species though only two of these have been noticed above They may now be distinguished as follows

a Caudal without small scattered dark spots
  b No dark ring of spots over middle of pectoral
    c Head 5½ *burmanica*
    cc Head 4½ to 5⅙ *leptocheila*
    ccc Head 4 . *kuhlii*
  bb Dark ring or group of dark spots over middle of pectoral, head 4¼ to 4¾ *siamensis*
aa Caudal with small scattered dark spots, head 4⅓ *lineata*

THYNNICHTHYS Bleeker

Type *Leuciscus thynnoides* Bleeker

THYNNICHTHYINA, new subgenus

Distinguished from subgenus *Thynnichthys* Bleeker by its much larger scales 11 to 13 above the lateral line to the origin of the dorsal fin (compared with 16 or 17 in *Thynnichthys*) and scales 47 to 60 (65 to 75 in *Thynnichthys*). Type *Thynnichthys thai*, new species

Thynnichthys thai, new species Figures 114 (head below), 115

Depth 3 to 3⅕, head 3⅓ to 3⅗, width 1⅔ to 2⅛. Snout 3½ to 4¼ in head; eye 3⅓ to 4⅕, subequal with snout, 1⅗ to 1⅘ in interorbital, with marginal adipose lids moderately invading iris, maxillary reaches ¾ to ⅘ to eye, length 4 to 4⅓ in head; mouth moderately wide, jaw edges not trenchant and jaws equal or subequal, interorbital 2⅕ or 2⅓ in head, with eyes little or scarcely visible as viewed from above lower interocular area, as seen across under surface of head, 3 to 3⅔, suborbitals broad, cover cheek No gill rakers, gill filaments equal eye Pharyngeal teeth 2, 4, 5—5, 4, 2, compressed, close *set, compact, all with oblique, smooth, grinding surfaces forming more or less common triturating area*

Scales 50 to 54 + 5 in lateral line; 13 above, 9 or 10 below to ventral origin, 10 below to anal origin, 21 or 22 predorsal Ventral with pointed axillary scale ¼ of fin Caudal base broadly scaly Lateral line complete, axial on side of body, nearly straight Scales with 7 or 8 apical radiating striae, of which 4 or 5 may be incomplete, 1 to 3 short radiating basal striae, circuli fine basally, converge, coarser or obsolete apically

D III, 8, I, first branched ray 1⅘ to 2 in head, A III, 5, I, first branched ray 1¾ to 1⅞, caudal 1⅗ to 1⅘ in rest of fish, slender lobes sharply pointed, least depth of caudal peduncle 2⅙ to 2¼ in head, pectoral 1¼ to 1⅓, rays I, 15, ventral I, 8, fin 1⅙ to 1¼ in head Vent close before anal

Back and upper surface of head pale olive, sides and lower surfaces pale brownish, evidently silvery white in life Iris grayish, evidently silvery white Jaws pale Fins pale brownish, lower ones evidently more or less whitish On dorsal each membrane more or less dark or dusky brown medially

A N S P, No 68,086 Me Poon, Siam Length 162 mm Type Also Nos 68,087 and 68,088, same data, paratypes Length 152 and 158 mm Three, 135 to 140 mm, Pitsanulok, Nos 68,089 to 68,091, also paratypes

Differs from the closely related *Thynnichthys thynnoides* (Bleeker) in the scales only 22 or less on the predorsal (30 accorded by Weber and Beaufort to *T. thynnoides*) Their figure of the latter shows only 9 scales between the lateral line and ventral origin, while Bleeker would show about 10 and the pectoral fin reaching over the ventral base

(*Thai*, the ancient name of the Siamese)

CATLACARPIO Boulenger

Body short, deep, compressed, deepest at dorsal origin Head very large, robust, long as body without caudal. Snout large, broad, obtuse as viewed above Eye small, at first third in head, lateral, with free margin all around, above middle in depth of head Mouth large, little inclined, lower jaw slightly projecting when closed. Lips narrow above, lower coriaceous, broader, end close but not meeting at lower front end of chin. Jaw edge rounded, lower broader. Nostrils together, similar, above level of eye and anterior with cutaneous flap Interorbital broadly convex. Suborbitals narrow Opercle and edge of gill opening with broad membraneous border Gill opening very large and deep, extends forward opposite front eye edge. Gill rakers finely lanceolate, long, numerous No pseudobranchiae. Pharyngeal bones small, teeth short, close set, uniserial on each bone Scales large, narrowly imbricated, in even longitudinal rows parallel with lateral line. No scales on head. Breast, chest and bases of dorsal, anal and caudal scaled Lateral line complete, distinct. Dorsal rather large, at summit of back, its insertion slightly post-median, anterior simple rays flexible Anal rather large, inserted behind dorsal, anterior simple rays flexible and fin extends when depressed behind squamous area on base of caudal Caudal large, well forked, fulcra moderate Caudal peduncle deep, short, well compressed Pectoral low, short, reaches little beyond origin of ventral, fin pointed Ventral inserted slightly before dorsal, slightly longer than pectoral.

A very curious genus characterized by its remarkable combination of characters The head is extraordinarily large, the fins all with greatly falcate lobes and the large scales even and firmly adherent The mouth is remarkable in the extended maxillary with the rictus distant subterminally

Catlacarpio siamensis Boulenger Figures 116 (head below), 117

Depth 2½ to 2⅘, head 2 to 2⅓, width 1⅞ to 2 Snout 3⅕ to 3⅔ in head from snout tip, eye 7⅞ to 9, 2⅝ to 2¾ in snout, 3½ to 4 in interorbital, maxillary reaches opposite front eye edge, length 2⅓ to 3 in head from snout tip, interorbital 2⅙, broadly convex, eyes only very slightly evident as seen from above, suborbitals invade about ⅓ of cheek Gill rakers 32 + 65, length 1⅔ times eye, gill filaments ⅘ long as gill rakers Pharyngeal teeth 4 – 4, strong, obtuse with entire grinding surfaces, all close set

Scales 28 or 29 + 3 to 5 in lateral line, 7 above, 5 below to ventral origin, 6 below to anal origin, 20 to 21 predorsal Paired fins without distinct axillary scaly flaps Row of rather large scales along bases of dorsal and anal Caudal base with several rows of scales Lateral line slopes down little at first until median along side, tubes small, simple, little exposed Scales with 40 to 45 apical radiating striae, 5 or 6 short basal striae, circuli fine basally, obscure or obsolete apically

D iii, 9, i, first branched ray 1⅕ to 1⅝ in total head length, A iii, 5, i, first branched ray 1⅝ to 1½, caudal 1 to 1⅙, deeply forked, lobes sharply pointed, least depth of caudal peduncle 2¾ to 3, pectoral 1⅞ to 2, rays i, 16, ventral 1¾ to 1⅘, rays i, 8 Vent close before anal

Back and upper surface of head dark olivaceous brown, sides and lower surfaces paler to whitish Scales on back and sides all with dark edges, and at scale junctures above and below more extended to form dark longitudinal bands Iris pale or whitish Upper lip narrowly and whole mandible pale or whitish Fins all pale olivaceous basally, becoming gray black to black terminally, all well contrasted

Three, 208 to 235 mm , Bangkok

OSTEOCHILUS Günther

Subgenus OSTEOCHILUS Gunther

Scales small, 45 to 55 in lateral line Scales 8 to 10 below lateral line to ventral origin Eye small. Dark blotch or bar on lateral line above pectoral Type *Rohita melanopleura* Bleeker

The species are *O. melanopleurus* (Bleeker) and *O borneensis* (Bleeker)

Osteochilus melanopleurus (Bleeker)

Seven, 69 to 153 mm , Bangkok.

NEOROHITA, new subgenus

Body elongately ovoid, well compressed Head small, compressed Snout rounded, moderate, its front edge entire and no lateral lobe covering upper lip Eye small or moderate, lateral, little advanced in head Mouth more or less terminal, protractile, usually partly to quite inferior Bony part of lower jaw forms trenchant, firm edge, without symphyseal tubercle Usually 2 pairs of barbels, as rostral and maxillary Lips continuous all around, fimbriate or fringed, especially lower Nostrils together on upper side of snout, posterior usually with cutaneous margin Suborbitals narrow or moderate Gill membranes broadly united to isthmus Pharyngeal teeth triserial Scales moderate or large, 30 to 40 in lateral line Lateral line distinct, complete, axial along side of body, tubes simple Males with large or small pearl organs on end of snout Dorsal inserted premedially, front simple rays slender or not bony, branched rays 10 to 18, begins before ventrals and ends before or behind anal origin Anal short, with 5 branched rays Caudal forked or emarginate Pectoral short, low Ventral similar Type *Rohita hasseltii* Valenciennes

Includes mainly the East Indian species of Weber and Beaufort, as *Osteochilus kelabau* Popta, *O schlegelii* (Bleeker), *O kahajanensis* (Bleeker), *O repang* Popta, *O triporos* (Bleeker), *O intermedius* Weber and Beaufort, *O bellus* Popta, *O brachynotopterus* (Bleeker), *O hasseltii* (Valenciennes), *O waandersii* (Bleeker), *O kappenii* (Bleeker), *O brevicauda* Weber and Beaufort, *O spirulus* (Bleeker) and *O harrisoni* Fowler This arrangement, in which the physiognomy is also different in the present forms, is due largely to the more elevated eyes and shorter snout Besides the species listed below the following are Siamese *O spilopleura* Fowler, *O macrosemion* Fowler, *O sima* (Sauvage) and *O lini* Fowler

(Νέος new + *Rohita*)

Osteochilus vittatus (Valenciennes) Figures 122 (head below), 123 (Kemrat)

Five, 55 to 123 mm , Bangkok, two, 128 to 130 mm , Kemrat

These agree with former materials I have studied from Siam, though are far more brilliant in coloration In the Kemrat specimens the dorsal and caudal were largely with orange red when freshly received, and the lower fins orange All have the usual rostral pearl-organs The Kemrat specimens also show a dark streak on each fin membrane of the dorsal parallel with its rays All are without trace of a dark pectoral blotch

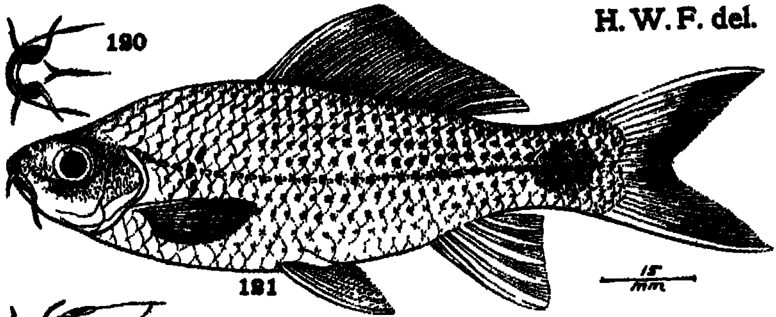
Osteochilus ochrus Fowler

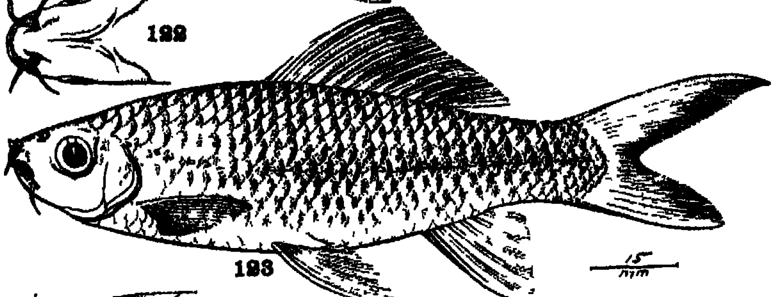
One, 94 mm , Kemrat

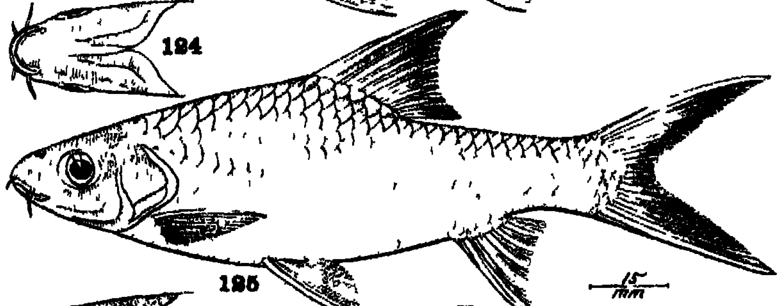
Osteochilus tatumi, new species Figures 118 (head below), 119

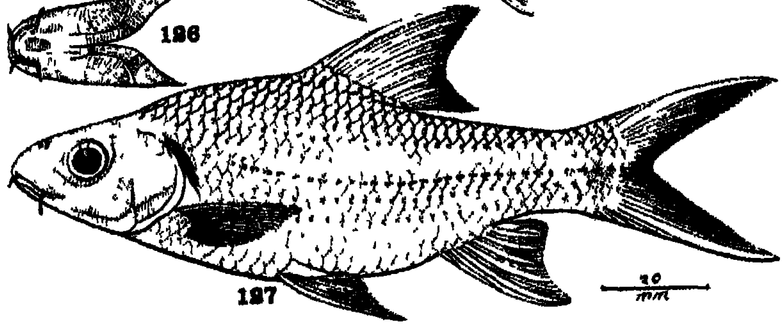
Depth 3½, head 3½, width 1⅘ Snout 3⅕ in head; eye 4½, 1⅓ in snout, 2 in interorbital, maxillary extends ⅔ to eye, length 3⅗ in head, lips entire, narrow, lower labial fold with edge rather feebly fimbriate, only one pair of barbels present, maxillary, about ⅘ of eye, interorbital 2⅘ in head, convex, suborbitals moderate, invade about ⅔ of cheek Gill opening extends forward

H. W. F. del.









120, 121. *Osteochilus duostigma* 122, 123 *Osteochilus vittatus*
124, 125 *Cyclocheilichthys dumerilii* 126, 127 *Cyclocheilichthys mekongensis*

below opposite hind preopercle ridge Gill rakers 5 + 30?, short, feeble, ciliaform, barely ¼ of gill filaments, which equal eye Pharyngeal teeth 5, 4, 3 on left bone, strongly compressed, close set, cuneate, without hooks, ends with broad entire grinding surfaces, form more or less compact triturating area

Scales 30 + 5 in lateral line, 6 below to ventral origin, 6 below to anal origin, 22 predorsal Ventral with pointed axillary scale 2½ in fin Caudal base well scaled Scales along edge of predorsal or in narrow median area, and along dorsal base fine, close set, and much smaller than those adjacent Lateral line complete, axial or median along side of body; tubes small, simple, little exposed Scales with 30 to 32 radiating apical striae, circuli fine basally, apically coarser, feeble and broken and imperfect to obsolete

D III, 13, I, first branched ray 1⅒ in head, A III, 5, I, first branched ray 1¼, caudal 2⅜ in rest of fish deeply forked, slender lobes, pointed, least depth of caudal peduncle 2⅓, pectoral 1½, rays I, 18, ventral rays I, 8, fin 1⅜ Vent at tips of depressed ventrals a little before anal

Back brown, sides and below paler to whitish Lips pale Iris gray, evidently white in life *At fifth scale of lateral line above 2 dark brown to* dusky small spots, and one below Diffuse grayish blotch or clouding at caudal base Fins pale brownish, dorsal with dark to blackish gray apex Caudal pale or slightly ochraceous basally, hind margin of fin grayish Other fins all pale to whitish, with yellowish tints basally

A N S P, No 68,095 Bangkok, Siam Length 117 mm Type

Apparently related to *Osteochilus ochrus* Fowler in the presence of but 2 maxillary barbels, the scales a little larger and smaller predorsal scales (22 in place of 11) The coloration, while suggestive is dissimilar *O tatumi* shows at least 4 series of pores on the snout, evidently scars of the pearl organs

(For the late Joseph W Tatum of Philadelphia, to whom I am indebted for interesting specimens and data on local fishes)

Osteochilus duostigma, new species Figures 120 (head below), 121

Depth 2¾ to 3, head 3⅓ to 4⅓, width 1⅔ to 1⅘ Snout 3 to 3⅓ in head, eye 3½ to 4, 1 to 1⅓ in snout, 1⅘ to 2⅓ in interorbital, maxillary extends ¾ to eye, length 3½ to 4 in head, lips broadly fringed continuously, inner faces broadly papillate, rostral barbel 1⅜ to 2 in eye, maxillary 1 to 1⅓ times eye, interorbital 1⅜ to 2 in head, broadly convex, suborbitals narrow, invade ⅓ of cheek to preopercle ridge Gill opening extends forward opposite hind edge of preopercle. Gill rakers 6 + 19, short, weak, close set points, ¼ of gill filaments which equal eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, compressed, close set, without hooks, all with entire oblique grinding surfaces, whole forming compact triturating area

Scales 27 to 30 + 2 or 3 in lateral line, 6 above, 4 below to ventral, 5 below to anal; 11 predorsal. Ventral with pointed axillary scale 2⅓ to 2⅜ in fin Caudal base scaled Chest and breast scaled Lateral line complete, axial, midway along side of body; tubes small, simple, short, little exposed Scales with 27 or 28 apical radiating striae, 3 or 4 short radiating basal striae, circuli fine basally, obsolete apically

D III, 14, I to III, 16, I, first branched ray $1\frac{1}{5}$ to $1\frac{1}{10}$ in head, A III, 5, I, first branched ray $1\frac{1}{5}$ to $1\frac{1}{3}$, caudal $2\frac{3}{4}$ to $2\frac{4}{5}$ in rest of fish, fin deeply forked, lobes sharply pointed, least depth of caudal peduncle $1\frac{3}{4}$ to $1\frac{4}{5}$ in head, pectoral $1\frac{1}{5}$ to $1\frac{1}{10}$, rays I, 15, ventral rays I, 8, fin $1\frac{1}{3}$ in head Vent close before anal

When fresh most all with a brilliant vermilion or orange spot on each scale of back and sides, fading to gamboge and finally to dark gray, or may disappear eventually Large dark gray to blackish blotch $1\frac{1}{2}$ times eye at caudal base Iris gray, evidently pale in life Lips brownish At fourth scale of lateral line blackish bar, also one on scale above and another on scale below Fins with bright red tinge when fresh, brilliant vermilion on ventrals and anal In preservative fins fade to orange and then pale or whitish, at least basally, dorsal with grayish

A N S P, No 68,096 Kemrat, Siam Length 115 mm Type Also No 68,097, same data, paratype Length 112 mm Other examples Nos 68,098 to 68,111 Bangkok, Siam Length 73 to 158 mm Paratypes

Agrees with *Osteochilus hasseltii* in the absence of pores on the snout, but differs in the presence of the dark or black spot at the fourth scale of the lateral line and others, both above and below

(Δύο two + στίγμα spot, with reference to the dark blotch each side of the body above the pectoral fin)

Osteochilus prosemion Fowler

One, 148 mm , Kemrat

Cosmochilus harmandi Sauvage Figures 149 (head below), 150

Depth $2\frac{3}{4}$ to 3, head 3 to $3\frac{3}{4}$, width $1\frac{3}{5}$ to 2 Snout $3\frac{1}{5}$ to $4\frac{1}{4}$ in head, eye 3 to $3\frac{3}{4}$, greater than to subequal with snout, $1\frac{1}{5}$ to $1\frac{3}{4}$ in interorbital, maxillary extends $\frac{3}{4}$ to $\frac{7}{8}$ to eye, length $3\frac{1}{4}$ to $4\frac{1}{2}$ in head, lips broadly papillate, with entire, firmly trenchant jaw edges, and lateral labial groove deep, rostral barbel 1 to 2 in eye, maxillary barbel $1\frac{1}{4}$ to $1\frac{7}{8}$, interorbital $2\frac{1}{4}$ to $2\frac{1}{3}$ in head, broadly convex, suborbitals narrow Gill opening extends forward opposite hind eye edge Gill rakers 4 + 11, short, cuneate, with broad bases, length $4\frac{1}{2}$ gill filaments, which $1\frac{1}{3}$ in eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, hooked moderately, with moderate, entire grinding surfaces

Scales 34 or 35 + 3 in lateral line, 8 above, 5 or 6 below to ventral, 6 below to anal, 14 predorsal Ventral with pointed axillary scaly flap $2\frac{1}{3}$ to $2\frac{3}{4}$ in fin. Vertical fins all with broad scaly bases Lateral line distinct, complete, axial along side of body, tubes slender, well exposed Scales with 8 to 28 apical radiating striae; 5 to 15 short basal striae, circuli basal, fine, obsolete apically

D IV, 8, I, fourth osseous ray with 24 antrorse denticles along its hind edge, all smaller basally, first branched ray $2\frac{1}{3}$ to $3\frac{1}{4}$ in fish without caudal, A. III, 5, I, front rudimentary rays pungent, entire, first branched ray $1\frac{3}{5}$ to $1\frac{4}{5}$ in head; caudal $2\frac{4}{5}$ to $3\frac{1}{5}$ in rest of fish, fin deeply forked, long lobes slender, pointed; least depth of caudal peduncle 2 to $2\frac{1}{3}$ in head; pectoral $1\frac{1}{3}$ to $1\frac{4}{5}$, rays I, 16; ventral rays I, 8, fin $1\frac{1}{4}$ in head. Vent close before anal

Light brown generally, lower sides and under surfaces paler to whitish with silvery white reflections Iris silvery white Jaws, lips and barbels pale Cheeks silvery white Dorsal and caudal light brownish, former with upper edge and latter with hind edge dark gray Lower fins whitish

Eight, 76 to 183 mm, Bangkok.

Hampala macrolepidota (Valenciennes) Figures 128 to 131 (Bangkok), 132 to 134 (Kemrat), 135 to 139 (Tachin)

Forty-three, 40 to 197 mm, Bangkok, ten, 40 to 97 mm, Tachin, one, 191 mm, Me Poon, eight, 74 to 180 mm, Kemrat Most have the caudal brilliant vermilion, though after the specimens were placed in alcohol it faded to yellowish and finally whitish

Three, 108 to 120 mm, from Kemrat represent *Hampala dispar* H M Smith, two showing the black spot exactly as the figures in the Chitrakarn drawing, though the dark borders of the caudal, both above and below are dark gray to blackish The caudal is also bright vermilion, a condition not mentioned by Smith

Cyclocheilichthys apogon (Valenciennes)

Eighty-four, 43 to 169 mm, Bangkok, eighteen, 28 to 58 mm, Me Poon, seventeen, 40 to 52 mm, Tachin In most all the fins were more or less vermilion when freshly received Iris and side of head silvery white

Cyclocheilichthys enoplus (Bleeker)

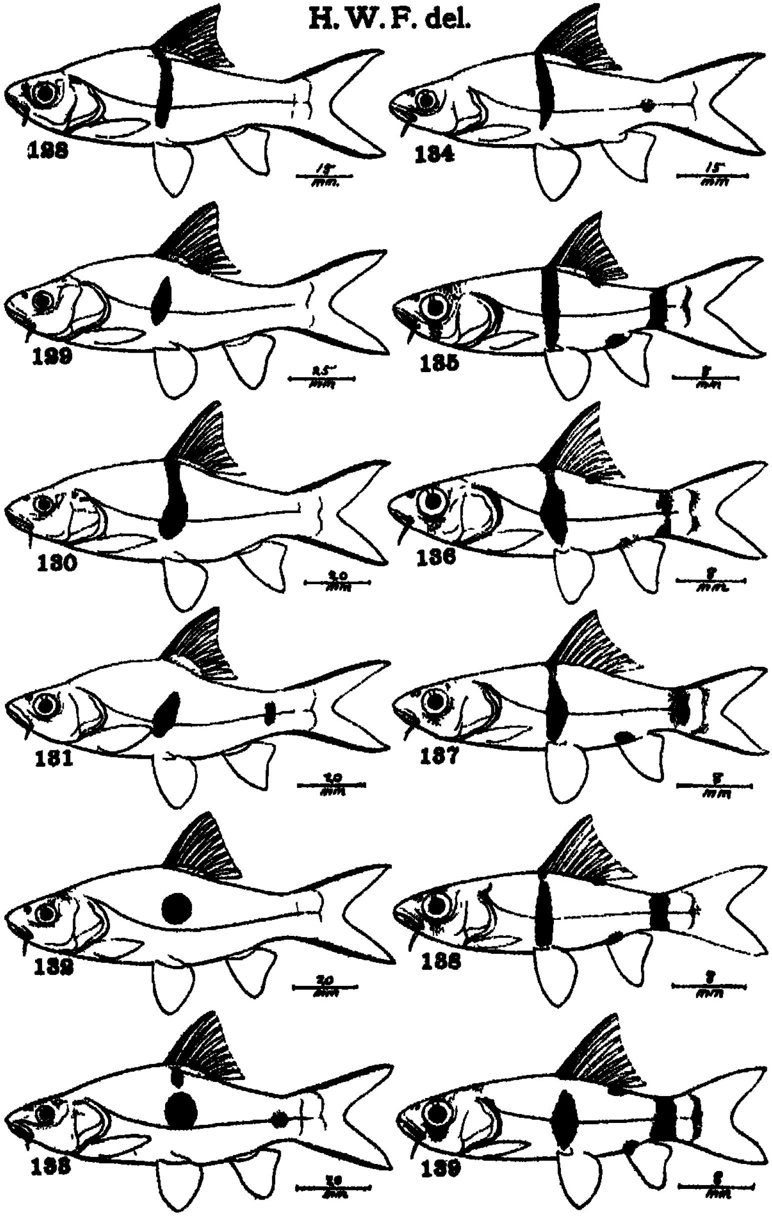
Depth 3, head 3½, width 1⅓ Snout 3¾ in head, eye 4¼, 1¼ in snout, 2 in interorbital, maxillary reaches ⅘ to eye, length 4⅛ in head, lips narrow, smooth, lower moderately interrupted at symphysis, front barbel ⅘ of eye, hind barbel 2 in eye, interorbital 2½, broadly convex, suborbitals narrow, invade about ⅓ of cheek to preopercle ridge Gill opening extends forward opposite angle of preopercle ridge Gill rakers 9 + 12, short bifid points, 2¼ in gill filaments, which 1¼ in eye Right pharyngeal teeth 5, 3, 2, outer larger, molariform and with entire, moderate concave grinding surfaces

Scales 36 + 4 in lateral line, 6 above, 5 below to ventral origin, 6 below to anal origin, 14 predorsal Ventral with free, pointed axillary scale, 2½ in fin Dorsal, anal and caudal bases scaly Head all more or less marked with fine, inconspicuous vertical striae Lateral line axial along side of body, each scale with tubular bifurcation Scales with 46 apical radiating striae, 15 short basal striae, circuli fine, largely basal, obsolete apically

D IV, 8, I, fourth ray osseous, robust, with about 22 antrorse denticles along its hind edge, first branched ray equals head, A III, 5, I, simple rays pungent, first branched ray 1⅗, caudal 2⅗ in rest of fish, fin deeply forked, lobes slender, pointed, least depth of caudal peduncle 2⅘ in head, pectoral 1½, rays I, 14, ventral rays I, 9, fin 1½ in head Vent nearer tips of depressed ventrals than anal origin

Head and back brown, sides below and under surfaces whitish Iris light or whitish Sides of head with silvery reflections Jaws pale Dorsal and caudal brownish, upper hind edge of former and hind edge of latter grayish Lower fins pale to whitish.

One, 312 mm, Bangkok. The specific name wrongly spelled *anoplos* in my listing of 1934 material



128 to 139 *Hampala macrolepidota* (variation)

Cyclocheilichthys repasson (Bleeker).

Eleven, 51 to 93 mm, Me Poon; seven, 88 to 115 mm, Pitsanulok, seventy-two, 43 to 95 mm., Tachin Barbels 4 Dark basal caudal spot.

Cyclocheilichthys armatus (Valenciennes)

Sixteen, 49 to 134 mm, Pitsanulok, one, 120 mm, Kemrat Only 2 barbels present, these maxillary

Cyclocheilichthys dumerilii Sauvage Figures 124 (head below), 125

Depth 3 to 3½, head 3 to 3⅜, width 1⅞ to 2¼ Snout 3⅔ to 3¾ in head, eye 3½ to 4, greater than snout in young to 1⅛ in snout with age, 1⅓ to 1½ in interorbital, with age moderate, marginal adipose lids develop; maxillary not quite reaching opposite eye, length 3⅞ to 4¼ in head, lips rather narrow, smooth, firm, lower moderately interrupted at symphysis, front or rostral barbel 3 in eye, maxillary barbel ⅔ of eye, interorbital 2⅝ to 3 in head, broadly convex, suborbitals narrow, invade ¼ of cheek to preopercle ridge Gill opening extends forward opposite hind angle of preopercle ridge Gill rakers 6 + 11, lanceolate, with broad bases, ⅓ of gill filaments, which ½ of eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, hooked and with moderate, entire grinding surfaces

Scales 28 to 33 + 2 or 3 in lateral line, 6 above, 4 below to ventral, 5 below to anal, 11 predorsal Pointed ventral axillary scale 3 in fin Dorsal, anal and caudal bases scaly Chest and breast scaled Lateral line complete, axial along side of body, tubes simple, moderate Whole surface of head with nearly transverse close set, inconspicuous striae Scales with 6 to 12 apical radiating striae, 6 to 8 short basal striae, circuli fine, basal, become obsolete apically

D IV, 8, I, osseous front simple rays slender with fourth furnished with about 24 antrorse denticles along its hind edge, first branched ray 1 to 1⅓ in head, A III, 5, I, first branched ray 1⅙ to 1½, caudal 2⅔ to 3 in rest of fish, least depth of caudal peduncle 2⅓ to 2¾ in head, pectoral rays I, 17, fin 1⅜ to 1½ in head, ventral 1⅓ to 1⅔, rays I, 9

Pale brown generally, sides and lower surfaces all with more or less silvery white reflections A more or less distinct silvery lateral streak along lateral line Iris bright silvery white Lower side of head bright silvery white Dorsal and caudal very light brown, slightly gray marginally Lower fins whitish

Forty-four, 54 to 140 mm, Bangkok; four, 76 to 131 mm, Me Poon; one, 64 mm, Tachin; two, 78 to 85 mm, Paknam, five 68 to 78 mm., Kemrat. This interesting species does not seem to have been seen since originally described in 1881 It is characterised chiefly by its very light and silvery white color Resemblance is seen with *C tapiensis* H. M Smith 1931, but the present species is without a vestige of a dark spot at the caudal base, the dorsal inserted more anterior or midway between the snout tip and caudal base, and the pectoral not reaching the ventral.

Cyclocheilichthys mekongensis, new species Figures 126 (head below), 127.

Depth 2⅗ to 3⅜, head 3¼ to 3⅓, width 2 to 2⅓ Snout 3½ in head, eye 3 to 3⅘, 1 to 1⅓ in snout, 1 to 1⅕ in interorbital, maxillary extends ⅗ to ⅔ to eye, length 4 to 4⅓ in head, lips fleshy, rather narrow, lower with free edge across symphysis of mandible, rostral barbel feeble, short, 4½ in eye, maxillary barbel 3, interorbital 3⅕ to 3¼ in head, low, broadly convex, suborbitals narrow, invade ⅓ of cheek to preopercle ridge Gill rakers 4 + 5, moderate, firm, strong, 2 in gill filaments, which 2 in eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, hooked, with moderate, entire, grinding surfaces

Scales 32 or 33 + 2 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin Ventral with pointed axillary scaly flap, 2⅓ to 2⅔ in fin Dorsal, anal and caudal bases scaly Small scales on chest Whole surface of head with distinct, close set or finely parallel transverse striae Lateral line distinct, complete, axial along side of body, tubes small, simple, slender, all well exposed Scales with 12 to 23 apical radiating striae, 2 or 3 basal striae, circuli fine, coarser to obsolete apically

D IV, 8, i, fourth osseous ray with 22 antrorse denticles along hind edge, first branched ray 1 to 1⅕ in head, A iii, 5, i, first branched ray 1⅗ to 1½, caudal 2⅔ to 3 in rest of fish, deeply forked, long slender lobes sharply pointed, least depth of caudal peduncle 2⅓ to 2½ in head, pectoral 1¼ to 1⅗, rays ii, 15, ventral rays i, 8, fin 1¼ to 1⅗ in head Vent 2 scales before anal origin or trifle before tips of depressed ventral rays

Back and upper surface of head light brown, each scale with brown marginal spot Dark brown bar along and obliquely behind gill opening Underlaid, ill defined gray band axially along side of tail and little expanded at caudal base Whole lower side and under surfaces with silvery white sheen Fins pale, dorsal and caudal grayish marginally

A N S P, No 68,112 Kemrat, Siam Length 151 mm Type Also Nos 68,113 to 68,132, same data, paratypes Length 48 to 150 mm Other material, eight, 88 to 114 mm, Pitsanulok

Close to *C tapiensis* H M Smith 1931, but that species said to be " Plain silvery, a round dusky spot on caudal peduncle, fins hyaline ", and the figure without the dark oblique bar behind the gill opening It is also said to have 37 scales in the lateral line, and the figure shows 5 below the lateral line to the origin of the ventral fin No mention is made of its gill rakers

(Named for the Mekong River, where the types were obtained)

Cyclocheilichthys amblyceps, new species Figures 140 (head below), 141

Depth 3⅓ to 3¾, head 3⅗, width 1⅘ to 1⅓ Snout 4¼ to 5 in head, eye 3 to 3¼, slightly greater than snout, 1¼ to 1⅓ in interorbital, maxillary reaches nearly to, or quite to eye, length 3½ to 4⅓ in head, lips rather narrow, thin, lower interrupted at mandibular symphysis, barbels minute to vestigeal or even absent, rostral always smaller or shorter, maxillary barely ¼ of eye, interorbital 3 to 3⅓ in head, low, broadly convex. Gill opening extends forward opposite hind edge of eye. Gill rakers 4 + 10, short, firm points, ¾ of gill filaments, which 1⅓ in eye. Pharyngeal teeth on right bone 5, 3, 2, hooked, with small, even grinding surfaces

Scales 34 or 35 + 2 or 3 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin, 9 or 10 predorsal of which most anterior largest. Axillary ventral scale 3 to $3\frac{1}{8}$ in fin Dorsal, anal and caudal scaly basally Head with numerous fine, parallel, transverse striae, less distinct on cheek and opercle Lateral line complete, distinct, axial along side of body; tubes moderate, simple, short Scales with 13 to 21 apical radiating striae, 7 to 10 short basal striae, circuli fine, basal, obsolete apically

D IV, 8, I, fourth simple ray osseous, rather slender, with 22 antrorse denticles along its hind edge, first branched ray $1\frac{1}{10}$ in head, A III, 5, I, first branched ray $1\frac{3}{5}$ to $1\frac{1}{2}$, caudal $3\frac{1}{8}$ to $3\frac{1}{3}$ in rest of fish, deeply forked, slender lobes sharply pointed, least depth of caudal peduncle $2\frac{1}{4}$ to $2\frac{1}{3}$ in head, pectoral $1\frac{3}{5}$ to $1\frac{1}{2}$, rays I, 19, ventral rays I, 9, fin $1\frac{1}{4}$ to $1\frac{1}{2}$ in head Vent little nearer depressed ventral tips than anal origin

Light brown, sides and below paler to whitish, with silvery reflections Axial along side of body underlaid and indistinctly defined silvery band No dark spot at caudal base Iris gray, evidently silvery white in life Fins pale, dorsal with upper edge and caudal with hind edge gray, and lower fins nearly whitish

A N S P, No 68,133 Bangkok, Siam Length 104 mm Type Also No 68,134, same data, paratype Length 90 mm

Known by its short blunt muzzle, less than the large eye, small barbels and pale coloration

('Αμβλυς blunt + κεφαλή head)

Lissochilus dukai (Day)

Twelve, 65 to 139 mm, Me Poon

Varicorhinus dyocheilus (Mac Clelland) Figures 142 (head below), 143

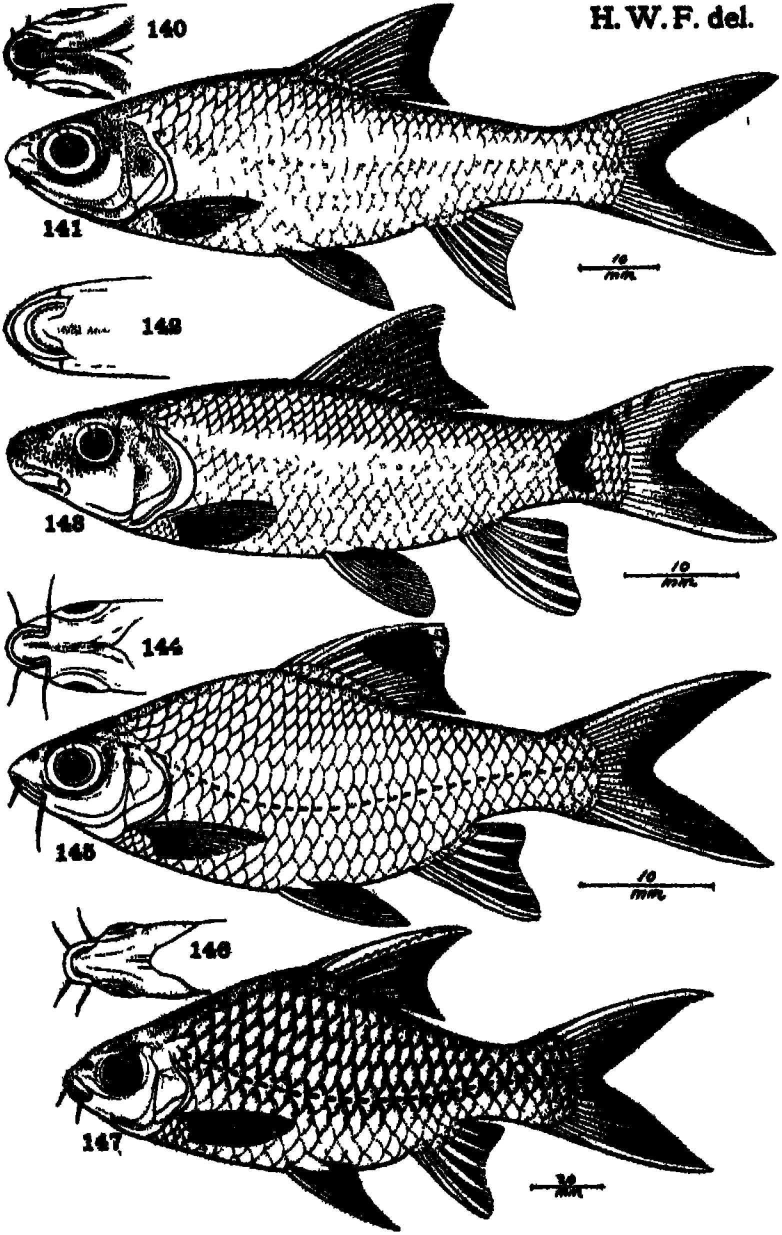
One, 103 mm, Bangkok, one, 230 mm, Pitsanulok, eighty-nine, 64 to 212 mm., Kemrat The young are somewhat different in appearance from the adult They also have a dark caudal blotch and some are furnished with pearl organs Mature or adult specimens with the dorsal often ruddy medially Lower fins tinged with vermilion, especially the ventrals All the lower fins show narrow pale to whitish edges

Barbus spilopterus Fowler

One-hundred and seventeen, 48 to 117 mm., Tachin

Barbus foxi, new species *Figures 144 (head below), 145*

Depth $2\frac{1}{4}$ to $2\frac{1}{2}$, head $3\frac{1}{4}$ to $3\frac{1}{3}$, width $1\frac{7}{8}$ to 2 Snout $4\frac{1}{8}$ to $4\frac{1}{2}$ in head, eye $2\frac{1}{2}$ to $2\frac{3}{5}$, greatly exceeds snout, $2\frac{3}{4}$ to $2\frac{4}{5}$ in interorbital, maxillary reaches eye, length $3\frac{1}{3}$ in head, lips narrow, firm, entire, lower moderately interrupted across chin; rostral barbel $1\frac{3}{5}$ in eye, maxillary barbel equals eye, interorbital 3 in head, low, broady convex, suborbitals narrow, invade $\frac{1}{3}$ of cheek to preopercle ridge. Gill opening extends forward opposite hind eye edge Gill rakers 3 + 9, short, firm points, $\frac{1}{4}$ of gill filaments, which 2 in eye. Right pharyngeal teeth 5, 3, 2, little hooked and with moderate, entire grinding surfaces



140, 141. *Cyclocheilichthys amblyceps.*
142, 143. *Varicorhinus dyocheilus*
144, 145. *Barbus foxi*
146, 147 *Barbus daruphani.*

Scales 29 + 3 in lateral line, 7 above, 4 below to ventral, 4 below to anal, 12 predorsal Ventral with axillary scaly flap 3 to 4 in fin Dorsal, anal and caudal bases scaly Small scales on breast. Lateral line distinct, complete, well decurved and becomes medial at caudal base, tubes slender, well exposed, simple Scales with 6 apical radiating striae, 1 short basal stria, circuli fine and close set basally, obsolete apically

D IV, 8, I, fourth simple ray, osseous, with 12 antrorse serrae along its hind edge, first branched rav equals head, A III, 5, I, front simple rays pungent, first branched ray 1⅕ to 1¼ in head, caudal 2⅓ to 2⅗ in rest of fish, lobes long, narrowly pointed, fin deeply forked, least depth of caudal peduncle 2⅕ to 2¼ in head, pectoral 1¼ to 1½, rays I, 16, ventral rays I, 8, fin 1⅕ to 1¼ in head Vent close before anal origin

Pale brown, sides and below with silvery white reflections Iris gray, evidently white in life Barbels and lips pale Fins pale to whitish, only dorsal contrasted with rounded, jet black blotch apically larger than eye, and upper and front edges of fin pale all around.

A N S P, No 68,135 Kemrat, Siam Length 57 mm Type No 68,136, same data, paratype Length 52 mm

Characteristic of this species is the large, contrasted black apical blotch on the dorsal fin, leaving a narrow pale edge to the fin all around in front and above *Puntius siamensis* Sauvage 1883 is based on an example 110 mm long and largely agrees in its body contour, barbels, snout shorter than the eye, and large scales (28) in the lateral line It differs markedly in the anal rays 11, but 5 scales above the lateral line and 3 below, and the ventrals inserted below the median part of the dorsal

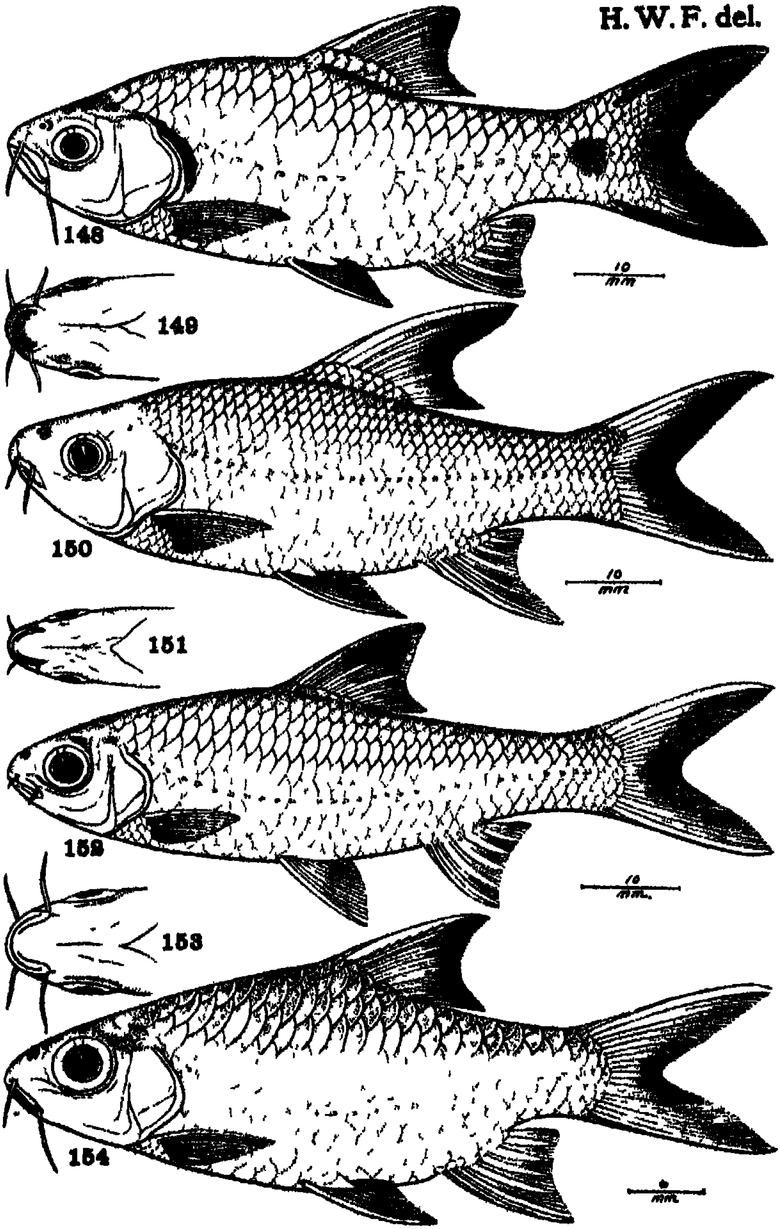
(To Mr William J Fox, to whom I am indebted for many valuable American fishes)

Barbus daruphani (H M Smith) Figures 146 (head below), 147

Depth 2¼ to 2⅗, head 3⅕ to 3⅘, width 1⅔ to 1⅘. Snout 3¼ to 3⅓ in head, eye 2⅗ to 4, ¼ greater than snout in young to 1⅕ in snout with age, 1⅕ to 1⅗ in interorbital, maxillary reaches nearly or quite to eye, length 3⅕ to 4⅓ in head, lips fleshy, narrow, smooth, lower moderately interrupted at mandibular symphysis, rostral barbel 1 to 1⅗ in eye or one may be absent, maxillary 1⅕ in eye to 1⅕ times eye, interorbital 2¼ to 2⅘ in head, broadly convex, suborbitals moderate, invade ⅓ of cheek to preopercle ridge Gill opening extends forward opposite hind eye edge Gill rakers 5 + 8, lanceolate, ¼ of gill filaments, which 1⅖ in eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, compressed, several of larger row enlarged, with narrow, entire grinding surfaces, and end in small points.

Scales 22 to 26 + 2 or 3 in lateral line; 6 above, 3 below to ventral origin, 4 below to anal origin, 8 to 10 predorsal Axillary pointed ventral scale 2⅓ to 3 in fin Dorsal, anal and caudal bases scaly. Small scales on breast and chest Lateral line complete, distinct, little decurved, becomes median at caudal base, tubes small, simple, well exposed. Scales with 47 apical radiating striae, 22 basal striae, circuli fine, basal, obsolete apically.

D IV, 8, I, fourth ray robust, osseous, with 17 strong antrorse striae along its hind edge, first branched ray 2⅘ to 3¼ in fish without caudal; A III, 5, I,



148 *Barbus orphoides* 149, 150 *Cosmochilus harmandi*
151, 152 *Barbus ashmeadi* 153, 154 *Barbus beasleyi*

first simple rays pungent with third entire and flexible terminally, 1 to 1¼ in head; caudal 2¼ to 2⅔ in rest of fish, deeply forked, with long slender lobes sharply pointed, least depth of caudal peduncle 1⅘ to 2¼ in head, pectoral 1⅓ to 1¼, rays I, 16, ventral 1 to 1⅕, rays I, 8 Vent close before anal

Pale brown above, sides and below paler to whitish, with silvery reflections On back each scale with darker brown basal pocket than body color Iris pale to whitish Lips and barbels pale Fins all pale, dorsal and caudal little grayish terminally and lower fins whitish

Fifteen, 92 to 178 mm, Me Poon, 67 specimens, 48 to 203 mm., Kemrat. These materials differ from *Puntius pierrei* Sauvage 1880 His figure shows an example, evidently large as he gives the length as 300 mm. It differs in much smaller fins, the pectorals reach 1⅓ to ventrals, 5 scales above the nearly straight lateral line and the small head (5¼ according to figure) The suborbitals are also shown as nearly covering the cheek

Puntius (*Barbodes*) *daruphani* H. M Smith 1934, based on a specimen 135 mm long (and another 163 mm) is rather incompletely described, especially as it is without a figure Its head is slightly smaller than my materials, or given as 3 9. Although the scales below the lateral line are indicated as "4 5 in transverse series", the number to the ventral origin is not given It is known from Raheng and Ban Pong *Poropuntius normani* H M Smith is based on a single specimen 105 mm long from near Chantaboon It differs largely in having the bluntly rounded snout covered with rows of large pores medianly, depth 3, scales 31, fourth osseous simple dorsal ray less than head or 1⅓ in body depth

Barbus orphoides Valenciennes Figure 148 (Bangkok)

Depth 2⅗ to 2⅘, head 3 to 3⅓, width 1½ to 1¾ Snout 3¼ to 4 in head, eye 3¾ to 4, subequal with snout, 1⅗ to 1⅘ in interorbital, maxillary reaches opposite front eye edge, length 3 to 3½ in head; lips moderate, fleshy, lower moderately interrupted at mandibular symphysis, lower jaw usually slightly shorter, or included in upper, rostral barbel ⅗ of eye to 1¼ times eye, maxillary 1⅓ to 2 times eye; interorbital 2¼ to 2⅓ in head, convex, suborbitals narrow, invade ⅓ of cheek to preopercle ridge Gill opening extends forward opposite hind eye edge Gill rakers 4 + 9, short, firm points, ⅘ of gill filaments, which 1¼ in eye. Pharyngeal teeth 2, 3, 5 — 5, 3, 2, some of larger row enlarged, ends conic, grinding surfaces broad and uneven

Scales 21 to 28 + 3 to 5 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin, 10 or 11 predorsal Ventral with pointed axillary scale 2 to 2½ in fin Bases of vertical fins scaly, on caudal broadly so. Lateral line distinct, complete, little decurved; tubes simple, moderate, well exposed Scales with 15 or 16 apical, more or less radiating striae, 12 to 15 basal radiating striae; circuli fine, basal, obsolete apically

D IV, 8, I, fourth osseous ray moderate, with about 20 close set more or less erect conic denticles on hind edge, first branched ray 1⅒ to 1⅓ in head, A. III, 5, I, front simple rays moderately flexible, first branched ray 1⅗ to 1⅘; caudal 2¾ to 3 in rest of fish, deeply emarginate, least depth of caudal peduncle 2 to 2¼ in head; pectoral 1⅛ to 1⅓, rays I, 14, ventral rays I, 8, fin 1⅓ to 1⅗ in head Vent close before anal.

Back and head above brown, sides and below paler to whitish, usually with silvery white reflections In some specimens sides and lower surfaces with brassy tint. Iris white to silvery white Barbels and lips pale. Close behind along upper edge of gill opening dark brown band More or less diffuse dark median blotch, large as eye, at caudal base Dorsal and caudal pale brownish, latter with upper and lower edges dark gray to blackish Paired fins and anal whitish When fresh opercle red, also paired fins, anal and caudal.

Ten, 90 to 160 mm, Bangkok, two, 110 to 153 mm, Pitsanulok, three, 73 to 78 mm, Me Poon, 56 specimens, 80 to 32 mm, Tachin The last have the dark borders to the caudal variously distinct. The dark basal caudal spot is more or less evident in all

Barbus ashmeadi, new species Figures 151 (head below), 152

Depth 3⅗ to 3¾, head 3¾ to 4, width 1⅗ to 2 Snout 3½ to 4 in head, eye 3 to 3⅓, greater than snout, 1 to 1⅓ in interorbital, maxillary reaches opposite or nearly opposite to front eye edge, length 3⅗ to 3¾ in head, lips smooth, narrow, lower interrupted at mandibular symphysis, barbels feeble, small, rostral little longer than maxillary or about ⅔ of eye, maxillary less than ¾ of eye, interorbital 3 to 3¼ in head, low, broadly convex, suborbitals moderate, invade about ⅗ of cheek to preopercle ridge Gill rakers 3 + 7, short points, ¼ of gill filaments, which 2 in eye Pharyngeal teeth 2, 4 — 4, 2, of which one enlarged in longer series, ends short conic points.

Scales 31 or 32 + 3 in lateral line, 5 above, 3 below to ventral origin, 4 below to anal origin, 11 predorsal Pointed axillary ventral scale half or more or fin Vertical fin bases scaly Small scales on breast and chest Lateral line distinct, complete, little decurved, ascends behind to middle of caudal base, pores all slender, simple, well exposed Scales with 12 to 22 apical radiating striae, 8 to 14 short basal striae, circuli moderate, basal, less distinct apically

D III, 8, I, first simple rays pungent, slender, hind edge of third with about 8 feeble denticles, first branched ray slightly less than head, A III, 5, I, first simple rays pungent, first branched ray 1⅓ to 1½ in head, caudal 2⅘ to 3 in rest of fish, deeply forked, least depth of caudal peduncle 1⅗ to 2¼ in head, pectoral 1⅓ to 1⅗, rays I, 15, ventral rays I, 8, fin 1¼ to 1⅗ in head Vent slightly nearer tips of depressed ventrals than anal origin

Light brown, paler to whitish on lower or under surfaces Iris gray, evidently pale to whitish in life Lips and barbels pale Fins all pale to whitish, dorsal with jet black apical blotch 1½ times eye, but with narrow white border all around upper edge

A N S.P, No 68,137. Kemrat, Siam Length 77 mm. Type Also Nos. 68,138 and 68,139, same data, paratypes. Length 53 and 68 mm

Distinguished by its slender form, short feeble barbels with the rostral a trifle longer than the maxillary pair and the dorsal with a conspicuous, contrasted, large, jet black apical blotch

(For Charles C. Ashmead, an early local contributor to the Academy's collection of fishes)

Barbus beasleyi, new species Figures 153 (head below), 154

Depth 2⅗, head 3⅛, width 1⅘ Snout 3⅞ in head, eye 3, ¼ times greater than snout, equals interorbital, maxillary reaches ⅞ to eye, length 3⅝ in head, lips moderate, smooth, fleshy, lower broadly interrupted at mandibular symphysis, rostral barbel ¾ of eye, maxillary about 1⅒ times eye, interorbital 3 in head, low, convex, suborbitals narrow, invade ¼ of cheek to preopercle ridge Gill rakers 3 + 5 short points, ¼ of gill filaments, which 2 in eye Right pharyngeal teeth 5, 3, 2, several of larger row enlarged and compressed tips short conic points, grinding surfaces narrow, oblique

Scales 23 + 3 in lateral line, 5 above, 3 below to ventral origin, 4 below to anal origin, 9 predorsal Ventral with free pointed scaly flap 2⅗ in fin Dorsal, anal and caudal bases scaly Lateral line complete, continuous, decurved, ascends to caudal base medially, tubes simple, slender, well exposed Scales with 19 apical, radiating striae, 12 short basal striae; circuli fine, basal, apically obsolete

D iv, 8, i, osseous anterior simple rays slender, with 13 antrorse denticles along hind edge of fourth, first branched ray 1⅒ in head, A iii, 5 i first 3 simple rays pungent and entire, first branched ray 1¼ in head, caudal 2⅗ in rest of fish, deeply forked, lobes slender and sharply pointed, least depth of caudal peduncle 2⅒ in head, pectoral 1⅗, rays i, 14, ventral rays i, 8, fin 1⅓ in head Vent close before anal

Pale brown, lighter or with silvery white reflections below or on sides An ill-defined silvery white underlaid lateral band axial along side of body On back each scale with brown basal pocket, little darker than general body color Iris gray Barbels and lips pale Dorsal and caudal pale brownish, former with upper margin gray, and latter with edge of inner angle gray

A N S P, No 68,140 Kemrat, Siam Length 62 mm Type

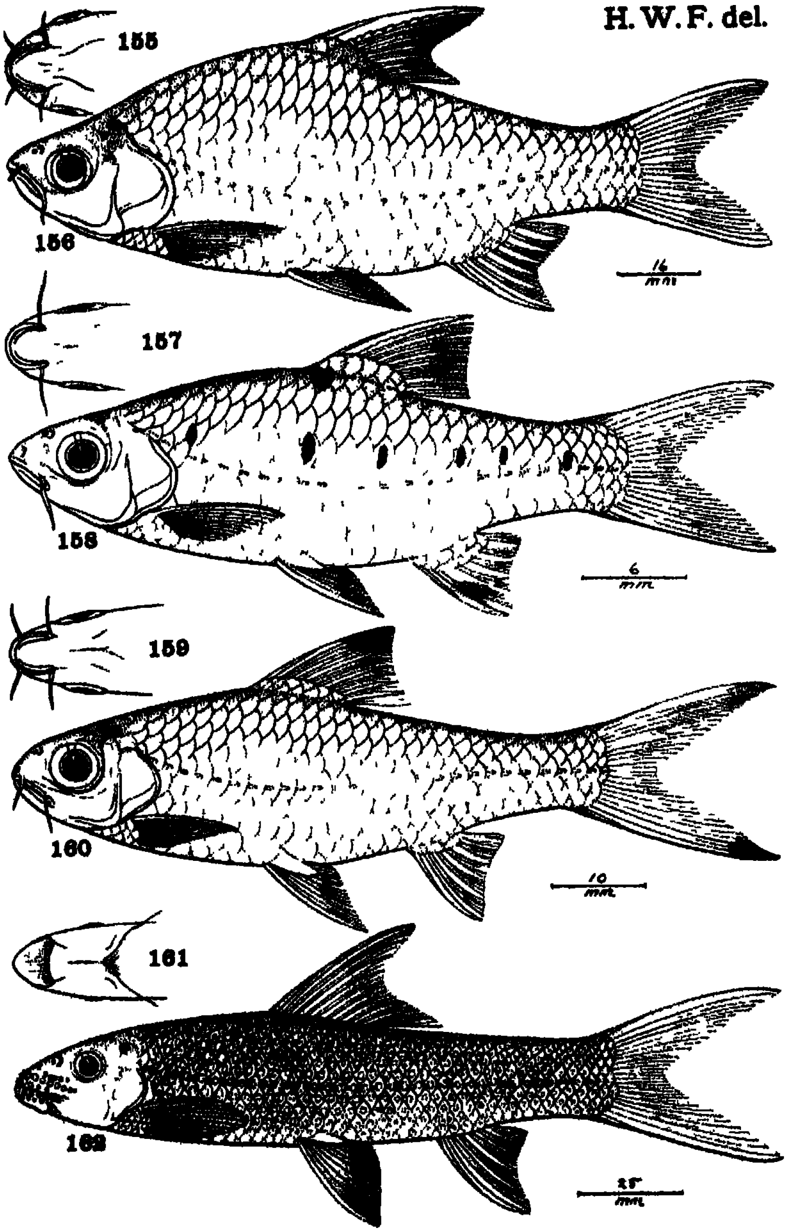
Resembles *Barbus pessuliferus*, but with much larger eye

(For Dr Morris Beasley, who early contributed to the collection of fishes of the Academy)

Barbus jolamarki (H M Smith) Figures 155 (head below), 156

Depth 2⅓ to 2⅗, head 3¼ to 3⅗, width 1¼ to 1⅓ Snout 3⅞ to 4 in head, eye 3⅛ to 4⅗, little greater than snout in young to subequal with age, 1⅘ to 1¾ in interorbital, maxillary reaches ⅝, or to front eye edge, length 3¼ to 4 in head, lips narrow, smooth, lower interrupted rather broadly at mandibular symphysis, interorbital 2⅛ to 2½ in head, broadly convex; suborbitals narrow, invade ⅓ of cheek to preopercle ridge. Gill rakers 6 + 10, short points, ¼ of gill filaments, which 1⅓ in eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, compressed, several in outer row enlarged, end in short conic tips, with narrow grinding surfaces smooth

Scales 26 or 27 + 2 or 3 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin, 10 or 11 predorsal Ventral with free pointed axillary scale 2¼ to 2¾ in fin Dorsal, anal and caudal bases scaly Chest and breast scaled Lateral line complete, distinct, decurved, ascends caudal base medially, tubes slender, simple, well exposed Scales with 23 to 49 apical radiating striae, 5 to 20 basal, short; circuli fine, basal, obsolete apically



155, 156 *Barbus jolamarki* 157, 158 *Barbus pessuliferus*
159, 160 *Barbus colemani* 161, 162. *Mekongina erythrospila.*

D. IV, 8, I, front simple rays osseous, compressed, fourth with 12 antrorse denticles along hind edge, first branched ray equals head, A III, 6, I, first simple rays pungent, first branched ray $1\frac{3}{5}$ to $1\frac{4}{5}$ in head; caudal $2\frac{4}{5}$ to $3\frac{1}{8}$ in rest of fish, deeply forked, lobes broad, pointed, least depth of caudal peduncle 2, pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$, rays I, 14, ventral rays I, 8, fin $1\frac{1}{5}$ to $1\frac{1}{4}$ in head Vent close before anal

Back and upper surfaces brown, sides and lower surfaces paler to whitish with silvery white reflections Iris white Barbels, lips and mouth pale. Dorsal and caudal pale, whitish basally, grayish marginally Lower fins whitish

Fifty-one, 60 to 109 mm, Pitsanulok A species of uniform color, without dark caudal blotch

Barbus javanicus Bleeker

Eighty-four, 48 to 179 mm, Bangkok, 119 specimens, 25 to 92 mm., Me Poon, 117 specimens, 33 to 175 mm, Pitsanulok, five, 43 to 153 mm, Komrat Depth $2\frac{1}{2}$ to $2\frac{2}{3}$ Maxillary barbel $\frac{2}{3}$ of eye, rostral shorter. Scales 28 + 3 in lateral line, 6 above, 4 below to ventral D III, 8, I, A. III, 6, I No markings except sometimes faint gray blotch on caudal peduncle at caudal base Eyes and lower side of head bright silvery white

Barbus pessuliferus, new species Figures 157 (head below), 158

Depth $2\frac{3}{5}$ to 3, head 3 to $3\frac{1}{4}$, width $1\frac{7}{8}$ to 2 Snout $3\frac{2}{3}$ to $3\frac{4}{5}$ in head, eye $3\frac{1}{8}$ to $3\frac{2}{3}$, greater than snout, $1\frac{1}{8}$ to $1\frac{1}{4}$ in interorbital, maxillary reaches $\frac{1}{3}$ to eye, length $3\frac{1}{8}$ to $3\frac{2}{3}$ in head, lips thin, narrow, smooth, entire, lower rather narrowly separated at symphyseal region of mandible, only one pair of barbels, $1\frac{1}{8}$ to $1\frac{1}{3}$ times eye, on upper hind end of maxillary, interorbital $2\frac{3}{5}$ to $2\frac{7}{8}$ in head, low, broadly convex, suborbitals narrow, invade $\frac{1}{3}$ of cheek to preopercle ridge. Gill opening extends forward opposite hind eye edge Gill rakers 3 + 8, short weak points, $\frac{1}{4}$ of gill filaments, which $\frac{3}{5}$ of eye Pharyngeal teeth 2, 3, 5 — 5, 3, 2, small, ends pointed

Scales 23 or 24 + 2 or 3 in lateral line, 5 above, 3 below to ventral origin, 4 below to anal origin, 8 or 9 predorsal Ventral with axillary scaly flap $2\frac{1}{8}$ to $2\frac{1}{4}$ in fin Vertical fins with scaly bases Chest and breast scaled Lateral line complete, distinct, decurved, ascends middle of caudal base, tubes slender, simple, all well exposed Scales with 5 to 7 apical radiating striae, 5 to 10 basal, mostly all complete and radiating from center of scale, circuli moderate, basal, obsolete apically.

D IV, 8, I, anterior simple osseous rays rather slender and hind edge with 12 or 13 small antrorse denticles, first branched ray equals head, A III, 5, I, first 3 simple rays slender, entire, third flexible terminally, first branched ray $1\frac{2}{3}$ to $1\frac{4}{5}$ in head, caudal $2\frac{3}{5}$ to $2\frac{4}{5}$ in rest of fish, deeply forked, lobes sharply pointed; least depth of caudal peduncle $1\frac{7}{8}$ to $2\frac{1}{10}$ in head; pectoral $1\frac{1}{5}$ to $1\frac{1}{3}$, rays I, 12, ventral rays I, 8, fin $1\frac{1}{4}$ to $1\frac{3}{5}$ in head Vent close before anal

Body brown, above, scales often showing darker pockets basally. Lower and under surfaces of body whitish with silvery reflections. Iris gray, evidently whitish in life Lips brownish, barbels paler. Along side of body above lateral line series of 6 or 7 blackish brown to blackish variable short vertical bars, in some specimens anterior ones may reach extent of 2 or 3 scales vertically, interspaces variable, though in none are all equidistant Fins pale brownish, lower ones whitish, sometimes dorsal terminally and front of anal subterminally with brownish Usually dark or blackish blotch at front of dorsal basally.

A.N.S.P., No 68,141 Kemrat, Siam Length 42 mm Type Also Nos 68,142 to 68,151, same data, paratypes Length 34 to 54 mm

Known by the presence of only two rather long barbels, the distinctive color pattern of several narrow short vertical black bars on the side of the body above the lateral line, and the black blotch at the front of the dorsal basally

(*Pessulus* a little bar + *fero* to bear)

Barbus colemani, new species Figures 159 (head below), 160

Depth 3⅛, head 4, width 1⅔ Snout 4 in head, eye 3, greatly exceeds snout, 1⅛ in interorbital, maxillary reaches slightly below front of eye, length 2¾ in head, lips thin, narrow, smooth, lower moderately interrupted at symphysis of mandible, rostral barbel 1⅓ in eye, maxillary 1⅜, interorbital 2⅛ in head, low, broad, slightly convex, suborbitals narrow, invade about ⅜ of cheek to preopercle ridge Gill opening extends forward opposite hind eye edge Gill rakers 4 + 6, short, robust points, ⅛ of gill filaments, which 2 in eye Right pharyngeal teeth 5, 3, with penultimate from lowermost of larger series, enlarged and ends in short conic point, others with smooth, entire, moderate grinding surfaces

Scales 26 + 3 in lateral line, 5 above, 3 below to ventral origin, 4 below to anal origin, 9 predorsal Ventral with free, pointed axillary scale 2⅛ in fin Bases of vertical fins scaly Chest and breast scaled Lateral line complete, distinct, decurved, ascends medianly to caudal base, tubes small simple, slender Scales with 14 apical radiating striae, 8 basal, short, circuli fine, obsolete apically

D iii, 8, i, front simple rays slender, pungent, entire, first branched ray equals head, A iii, 5, i, first simple rays slender and third flexible terminally, first branched ray 1½ in head, caudal 2¾ in rest of fish, deeply forked and long slender lobes sharply pointed, least depth of caudal peduncle 2 in head; pectoral 1¼, rays i, 18, ventral rays i, 9, fin 1⅓ in head Vent at ends of depressed ventrals

Pale brown, sides and below lighter with bright or silvery white tinge Iris pale or whitish. Barbels pale, also jaws and lips Fins light to whitish, apices of dorsal and caudal lobes black.

A N S P, No 68,152. Me Poon, Siam Length 80 mm Type

Distinguished by its combination of characters, trim contour of the body and contrasted coloration

(For Waldburg Coleman, an early contributor to the collection of fishes in the Academy.)

Barbus binotatus Valenciennes

One, 25 mm , Pitsanulok, twenty, 48 to 67 mm , Rayong, 68 specimens, 42 to 94 mm , Tachin, 327 specimens, 25 to 128 mm , Me Poon One specimen from Me Poon has the left eye completely atrophied In most all Me Poon specimens the black spot below the front of the dorsal is present, likewise the black caudal spot A black bar on the shoulder girdle, behind the gill opening, also often present

Barbus brevis (Bleeker) Figures 165 (head below), 166 (Bangkok)

Two, 70 to 78 mm , Tachin, 26 specimens, 45 to 64 mm , Rayong, 300 specimens, 65 to 110 mm , Bangkok Scales 21 + 3 in lateral line D III, 8, I, A III, 5, I Only 2 barbels Black spot, little smaller than eye, before caudal base End of anal usually dusky to blackish Lower fins vermilion

Barbus altus Gunther* Figures 163 (head below), 164 (young, Bangkok), 167 (head below), 168 (adult, Bangkok)

Depth 1⅞ to 2⅛, head 3⅛ to 3½, width 1¾ to 1⅞ Snout 4 to 5⅓ in head, eye 2⅞ to 3⅛, greater than snout, 1 to 1⅜ in interorbital, maxillary reaches nearly or quite opposite front eve edge length 3 to 4 in head, lips thin, narrow, smooth, lower moderately interrupted at mandibular symphysis, rostral barbel 1 to 1⅜ in eye, maxillary barbel equals eye, interorbital 2¼ to 2¾ in head, low, slightly convex, suborbitals invade ¼ to ⅜ of cheek to preopercle ridge Gill opening extends forward opposite hind edge of eve Gill rakers 5 + 8 short, robust points, ¼ of gill filaments, which 1¾ in eve Right pharyngeal teeth 5, 3, 2, penultimate from below enlarged, tips short conic points, and smooth, moderate grinding surfaces developed

Scales 28 to 30 + 2 in lateral line, 8 or 9 above, 5 below to ventral origin. 5 below to anal origin, 9 predorsal Axillary ventral scale 2⅛ to 2¾ in fin Vertical fins with scaly bases Small scales on chest and breast Lateral line complete, distinct, decurved, ascends caudal base medially, tubes simple, short Scales with 10 to 18 apical radiating striae, 5 short basal striae, circuli fine basally, obsolete apically

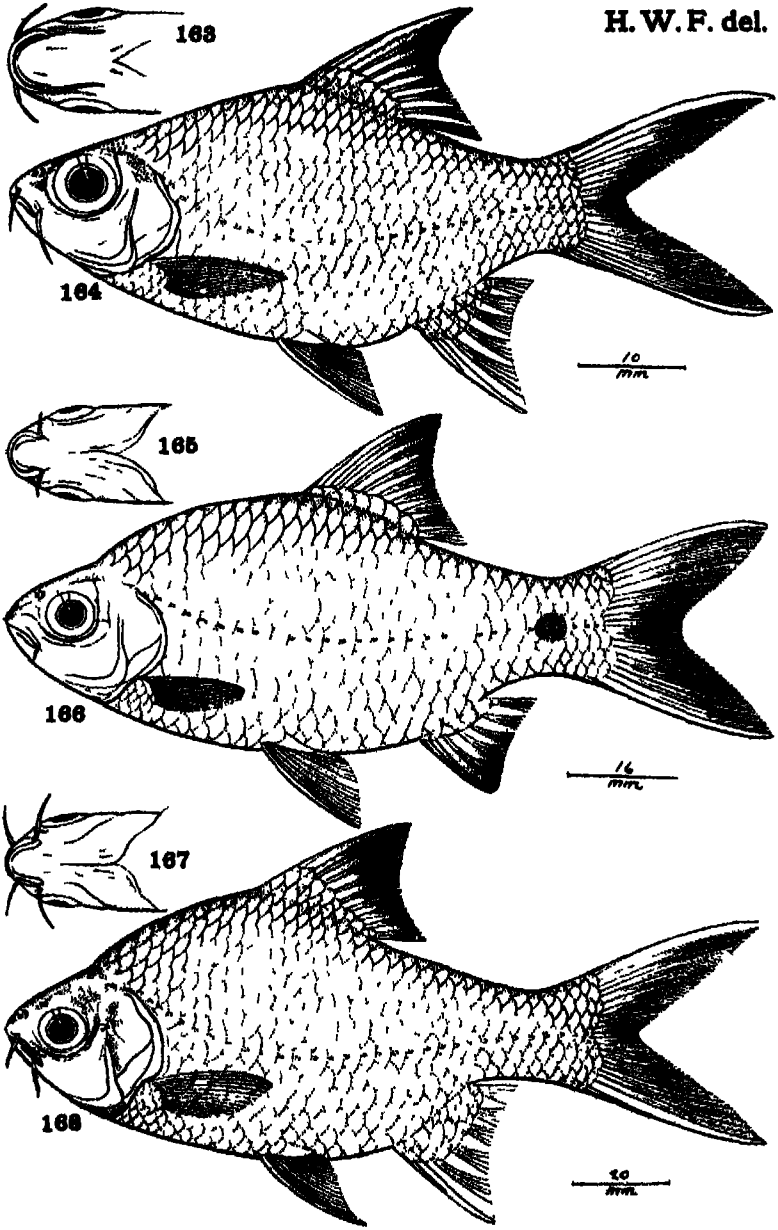
D IV, 8, I, anterior osseous rays robust, fourth with 12 antrorse denticles along its hind edge, first branched 1⅒ in head to 1⅛ times head, A III, 5, I, first 3 simple rays strongly pungent, in smallest specimen end flexible, first branched ray 1⅛ to 1¼ in head, caudal 2¼ to 2½ in rest of fish, deeply forked, long slender lobes sharply pointed, least depth of caudal peduncle 1⅞ to 2⅛ in head, pectoral 1⅛ to 1⅜, rays I, 14 to I, 16, ventral rays I, 8, fin 1¼ to 1⅓ in head Vent close before anal

Light brown, paler to whitish with silvery reflections on sides and below Iris white Lips and barbels pale Fins pale to whitish, dorsal with gray black apex, and some specimens with yellowish tinge to lower fins

Three, 81 to 150 mm , Bangkok, one 58 mm , Paknam; one, 58 mm , Kemrat An interesting species not previously represented in our collections

Puntioplites proctozysron (Bleeker).

Seven, 78 to 130 mm., Bangkok; two, 64 to 195 mm., Me Poon, one, 160 mm , Pitsanulok, thirteen, 68 to 180 mm , Kemrat.



163, 164 and 167, 168 *Barbus altus* 165 and 166 *Barbus brevis*

Balantiocheilus melanopterus (Bleeker) * Figures 185 (head below), 186 (Kemrat)

Two, 155 to 160 mm., Bangkok; three, 73 to 76 mm, Kemrat. The original figure by Bleeker in his Atlas gives a very poor idea of the species as compared with my specimens The black borders to the fins are entirely different, very broad, and merge or become pale against the flushed or rosy bases Also the upper lip is shown as greatly papillose Weber and Beaufort have also given an equally perplexing figure It shows the eye as longer than the snout and 6 scales between the lateral line and the ventral origin. Their description however rectifies this as it gives "eye 3½–4, less than snout," and "Ventrals separated by 3½ scales from the 9th scale of lateral line" This figure while showing the black borders to the fins, better contrasted than Bleeker's, indicates a black bar before the lateral line on the head, not found in my specimens

Barbichthys laevis (Valenciennes)

Seven, 152 to 183 mm, Me Poon, two, 115 to 128 mm, Kemrat

Morulius pectoralis (Sauvage)

Two, 72 to 101 mm, Tachin, nine, 80 to 157 mm, Bangkok, thirteen, 108 to 228 mm., Kemrat In none does the pectoral extend over the ventral base The front lobe of the dorsal is, however, quite variable, and in one large specimen at least reaches back nearly far as end of last dorsal ray Most have the fin edges more or less pale gray or whitish, though the general color gray black No orange or red on scales at present

MEKONGINA, new genus

Body elongate, slender, trim, moderately compressed Head small, robust, subpyramidal Snout long, obtuse Eye large, elevated, largely postmedian in head Mouth transversely inferior No barbels. No distinct rostral fold Upper lip broad, flat, with wide papillate areas and its hind edge festooned, or with a series of small papillate lappets Nostrils close together, nearer eye than end of snout, separated by a broad membranous flap Interorbital broad Gill openings lateral, leave broad isthmus. Scales moderate, more or less uniform over most of body, in even longitudinal rows, small and crowded on chest Lateral line distinct, nearly straight. Dorsal origin premedian, with 10 branched rays. Anal small, begins behind depressed dorsal, and falcate like dorsal Caudal deeply forked Pectoral small, low, reaches ⅘ to ventral. Ventral begins below first third of dorsal base Coloration brilliant. Type *Mekongina erythrospila*, new species

Differs from *Labeo* in its lip structure, and the absence of barbels Pearl organs a band of several series around the end of the muzzle.

(For the Mekong River)

Mekongina erythrospila, new species Figures 161 (head below), 162.

Depth 4 to 4¼, head 3⅘ to 4⅓, width 1⅜ to 1¾. Snout 2 to 2¼ in head; eye 3⅓ to 4¼, 1⅗ to 2 in snout, 1¼ to 2 in interorbital; mouth width 2⅓ to 3 in head, no rostral fold, broad upper lip broadly papillate, festooned, with about 18 to 20 marginal lappets, lower lip broad, smooth, little papillate marginally in young, forms entire margin across symphysis, no barbels, from each mouth corner rather deep groove converges toward isthmus, interorbital 2 to 2⅓ in head, slightly convex, suborbitals moderately wide, invade ⅓ of cheek Gill rakers 5 + 34, largely uniform short points, ⅓ of gill filaments, which equal eye Pharyngeal teeth 3, 5 — 5, 3, small, compressed, close set, cultrate, all with oblique, smooth grinding surfaces

Scales 30 to 35 + 3 or 4 in lateral line, 7 above, 4 below to ventral origin, 5 below to anal origin, 12 predorsal along each side of narrow naked predorsal strip its entire length Ventral with pointed free scaly axillary flap, 2 to 2¼ in fin Caudal base scaly Lateral line axial along side of body, median; tubes small and little exposed Scales with 23 to 37 apical radiating striae; no basal striae, circuli fine, basal, obsolete apically From below each eye forward around end of snout 4 rows of pearl organs, lower two rows with largest tubercles

D III, 10, I, first branched ray 3½ to 3⅝ in fish without caudal, A III, 5, I, first branched ray 1⅒ to 1⅓ in head, caudal 2⅗ to 2¾ in rest of fish. slender lobes sharply jointed, least depth of caudal peduncle 1⅗ to 2 in head, pectoral 1⅒ to 1¼, rays I, 17, ventral rays I, 8, fin 1⅒ to 1⅓ in head Vent opposite last fourth or opposite ends of depressed ventrals

Back and sides brown, each scale with a bright vermilion spot Under surface of head and body pale to whitish Iris gray Lips and cheeks pale Young with diffuse dark gray blotch at caudal base, about large as eye, obliterated or less distinct with age Dorsal and caudal brownish, grayish terminally, some specimens with reddish tinge Lower fins, as pectoral, ventral and anal deep vermilion, pale or whitish in alcohol

A N S.P , No 68,158 Kemrat, Siam Length 193 mm. Type Also Nos. 68,159 to 68,168, same data, paratypes Length 73 to 183 mm. Also 56 others, same data

Small examples only 100 mm long show the pearl organs and coloration of the largest The species is known by its brilliant coloration and structural characters as given above, especially noteworthy in the naked predorsal strip.

(Ερυθρος red + σπῖλος spot.)

LABEO Cuvier

Labeo bicolor H M Smith

Depth 3¼; head 4⅓, width 1⅔. Snout 3 in head, eye 4¼, 1⅓ in snout, 1⅞ in interorbital; maxillary reaches below nostrils, mouth as seen below broad shallow arc, width 3⅓ in head, lips broad smooth, entire, rostral barbel well anterior, ⅗ of eye, maxillary long as eye, interorbital 2⅗ in head, low, broadly convex; suborbitals narrow. Gill rakers 3 + 15, short feeble points, ¼ of gill filaments, which 1⅓ in eye Right pharyngeal teeth 5, 3, 2, pointed, with entire, narrow grinding surfaces.

Scales 30 + 3 in lateral line, 6 above, 5 below to ventral origin, 6 below to anal origin, 11 predorsal. Ventral with pointed axillary scale 2⅓ in fin. Caudal base scaly. Small scales on chest and breast. Lateral line straight, axial along middle of side of body, tubes moderate, simple, well exposed Scales with 16 to 20 radiating apical striae, 4 to 9 short basal striae, circuli fine, basal, obsolete apically

D iii, 12, i, front simple rays slender, entire, longest terminally flexible, first branched ray 1⅓ in head, A iii, 5, i, front simple rays entire and slender, first branched ray 1¼, caudal 2¾ in rest of fish, deeply forked, slender lobes sharp pointed, least depth of caudal peduncle 2 in head, pectoral 1⅛, rays i, 16, ventral rays i, 8, fin 1⅓ in head Vent at tips of depressed ventrals close before anal

Brown above, paler to whitish on lower surfaces and below Whole side sprinkled with dark dots, not extending on under surface of belly On scale at beginning of lateral line small blackish spot less than pupil, and another large as pupil on scale above fifth scale of lateral line, besides less distinct one on scale below it. Rounded black blotch at caudal base large as eye Rostral barbel brown, maxillary barbel whitish Iris gray Lips whitish Dorsal, ventral and anal blackish, basally each fin paler, and ventrals and anal with narrow whitish margin Caudal white, also pectoral

One, 70 mm, Tachin Agrees with the original account except the dark spot below the fifth scale of the lateral line is not mentioned

Labeo frenatus Fowler

Two, 60 to 68 mm, Tachin Differ slightly in the nearly blackish anal with white edge Small black spot over fifth scale of lateral line

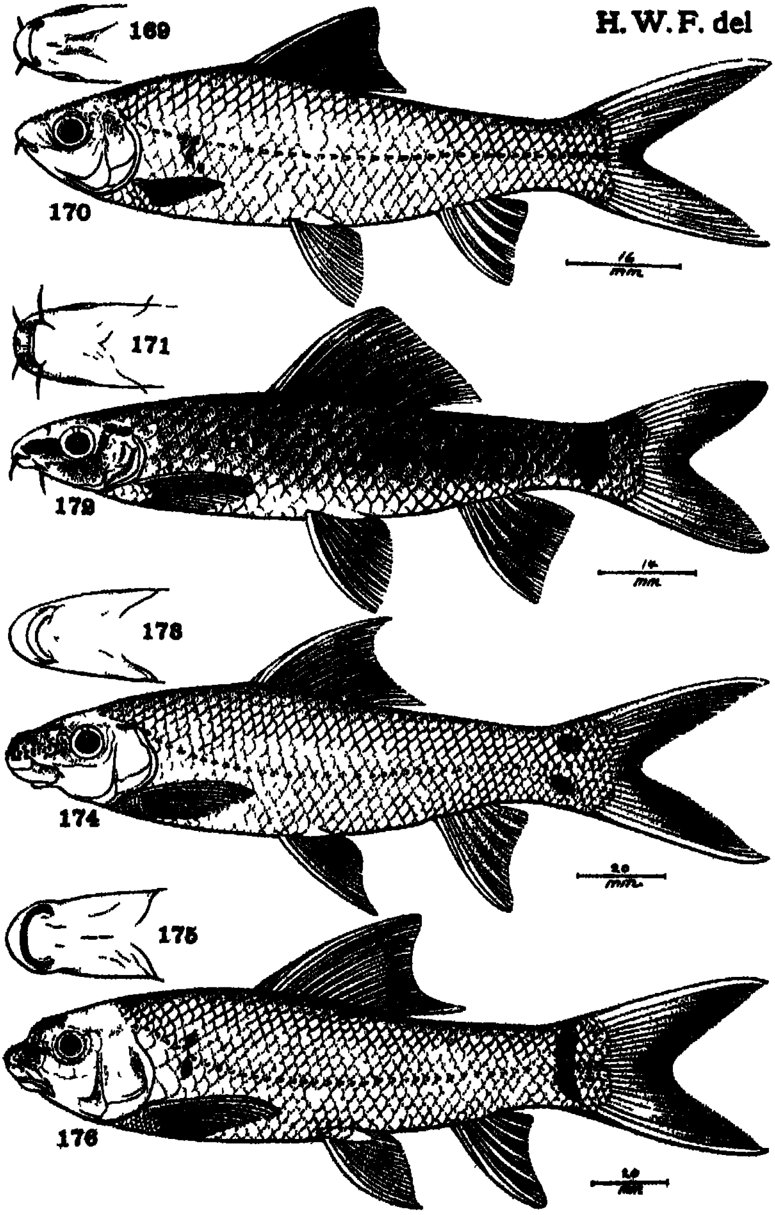
Labeo stigmapleura, new species Figures 169 (head below), 170 (Kemrat)

Depth 3½ to 4, head 4 to 4⅜, width 1⅗ to 1⅞ Snout 3 to 3⅛ in head, eye 2⅛ to 3¼, little greater than snout in young to equal with age, 1⅛ to 1⅞ in interorbital, mouth rather small, inferiorly transverse, width 3¼ to 3½ in head, lips entire, smooth, rostral barbel ½ to ⅜ of eye, no maxillary barbel, interorbital 2⅛ to 2⅕ in head, low broadly convex, suborbitals narrow Gill rakers 6 + 40, short, feeble points, ⅓ of gill filaments, which ⅗ of eye. Pharyngeal teeth 2, 4, 5 — 5, 4, 2, compressed, with well-developed concave, smooth grinding surfaces, no hooks

Scales 33 or 34 + 3 in lateral line, 7 above, 5 below to ventral origin, 5 or 6 below to anal origin, 12 or 13 predorsal Ventral with pointed axillary scale 2¼ to 3 in fin Caudal base scaly Rather small scales on chest and breast. Lateral line complete, axial on side of body, well marked, each scale with short simple tube. Scales with 12 to 17 apical radiating striae, 0 to 5 short basal striae, circuli fine, basal, obsolete apically Top of head from snout above to predorsal scales studded with numerous, close set, minute pearl organs

D iii, 11, i, front simple rays slender, entire, first branched ray 4 to 4¼ in fish without caudal, A. iii, 5, i, first branched ray 1⅓ to 1¼ in head; caudal 2½ to 2¾ in rest of fish, deeply forked, long slender lobes sharply pointed, least depth of caudal peduncle 1⅓ to 2 in head, pectoral 1¼ to 1⅗, rays i, 15, ventral i, 8, fin 1⅛ to 1¼ in head. Vent close before anal

Dull brown, sides and below pale to whitish. At fourth and fifth scales of lateral line each scale black bordered, also 2 scales below, or may even include 3. Lips and barbels pale Iris whitish Dorsal rays pale or light



169, 170 *Labeo stigmapleura* 171, 172 *Labeo erythrura*
173, 174 *Labeo cheveyi* 175, 176 *Labeo behri*

brown, membranes dotted with dark gray to gray black terminally, also ends of rays so upper edge of fin dark Caudal light brown, inner and hind edge gray Lower fins all pale or whitish, with some yellowish tints basally

A N S.P , No 68,169 Kemrat, Siam. Length 104 mm. Type Also Nos 68,170 to 68,179, same data, paratypes Length 50 to 115 mm Besides these 53 specimens also same data, not included as paratypes, two, 63 to 80 mm , Bangkok

Apparently to be distinguished by its distinctive color marking on the lateral line above the pectoral, suggestive of certain species of *Dangila*

(Στίγμα spot + πλευρά rib, with reference to the dark marking above the pectoral)

Labeo erythrura, new species Figures 171 (head below), 172

Depth 3⅓ to 4⅗, head 4⅓ to 4½, width 1⅘ to 1⅞ Snout 2½ to 2⅔ in head, eye 3¾ to 4, 1⅓ to 1⅗ in snout, 1⅔ to 2⅓ in interorbital, mouth transverse, slightly before nostrils, width 3 to 3⅗ in head, upper lip with about 16 broadly papillate lappets or plaits, form finely notched edge, lower lip entire, with rather well-marked labial groove directed toward isthmus, from each angle or corner of mouth, rostral barbel ¾ to ⅞ of eye, maxillary barbel ⅗ to ⅞, interorbital 2¼ to 2⅗ in head, low, broadly convex, suborbitals narrow Gill rakers 4 + 26, short, lanceolate, ⅓ of gill filaments, which equal eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, cultrate, without terminal hooks, with concave, smooth grinding surfaces

Scales 27 to 30 + 3 or 4 in lateral line, 5 above, 4 below to ventral origin, 5 below to anal origin, 10 or 11 predorsal Ventral with scaly flap 2 to 2⅓ in fin Caudal base scaly Moderate scales on chest and breast Lateral line complete, continuous, axial along side of body, tubes small, simple, short, little exposed Scales with 34 to 38 apical radiating striae, 6 to 22 short marginal basal striae, circuli fine basally, obsolete apically

D III, 11, I, first branched ray 4⅓ to 4⅗ in fish without caudal, first simple rays slender and smooth, longest terminally flexible, A III, 5, I, first branched ray 1 to 1⅒ in head, caudal 2¾ to 3 in rest of fish, well forked, lobes pointed, least depth of caudal peduncle 1⅔ to 2 in head, pectoral 1 to 1⅓, rays I, 15, ventral rays I, 9, fin 1 to 1⅒ Vent a little before anal origin or at ends of depressed ventrals

Body above and on sides more or less dark brown, under surfaces pale or whitish Large rounded black blotch contrasted, twice size of eye, at caudal base Blackish preocular band about wide as pupil Iris gray Rostral barbel blackish. Maxillary barbel pale or whitish like lips. Dorsal with membranes grayish, become darker to gray black basally, upper edge of fin broadly much paler. Caudal brilliant vermilion, turns orange and then brownish to whitish in alcohol. Pectoral pale to whitish. Anal dark gray, gray black on membranes medially Ventral like anal, often paler and ends and border pale to whitish.

A N.S P , No. 68,180. Kemrat, Siam Length 119 mm. Type. Also Nos 68,181 and 68,182, same data, paratypes. Length 103 to 117 mm.

Greatly like *Labeo munensis* H M Smith 1934 from the Menam Mun at Tha Chang, in eastern Siam, also the Mekong basin *L erythrura* differs in several very distinct characters, its dorsal and ventrals all rather broadly pale or whitish, though the pale margin not in contrast or sharply defined, no dark humeral spot and black blotch on caudal peduncle without forward extension on lateral line, pectoral not reaching opposite dorsal origin, black band along each side of snout before eye and slightly behind eye

(*Ἐρυθρὸς* red + *οὐρὰ* tail)

Labeo cheveyi, new species Figures 173 (head below), 174.

Depth 3⅔ to 3⅞, head 3⅔ to 3⅘, width 1⅖ to 1⅘ Snout 2¼ to 2⅓ in head, eye 4 to 4¾, 1¾ to 2 in snout, 1¾ to 2⅕ in interorbital, mouth broadly crescentic as viewed below, width 3 to 3¼ in head; lips broadly fleshy, smooth, edge of upper entire though edge of labial fold slightly uneven, hardly fringed, and lower lip edge fringed or papillate all around, a very small and largely concealed maxillary barbel, interorbital 2¼ to 2⅘ in head, low, broadly convex, suborbitals narrow Gill opening extends forward opposite hind eye edge Gill rakers 4 + 40, short, slender, close set points, ¾ of gill filaments, which 1½ in eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, close set, compact, cultrate, with broad, entire grinding surfaces

Scales 34 or 35 + 4 in lateral line, 9 above, 6 below to ventral origin, 6 below to anal origin, 14 predorsal Ventral with pointed axillary scale 2¼ to 2½ in fin Caudal base scaly Scales small and crowded on chest and breast Lateral line complete, continuous, axial along side of body, tubes short, simple, little exposed Scales with 24 to 25 radiating apical striae, 1 to 4 short basal striae, circuli fine, basal, obsolete apically Pearl organs extensive over whole of snout, largest and most conspicuous on front sides and around end of snout, small and minute above arc in internasal space, all are close set, and smooth to touch

D III, 11, I, front simple rays pungent, entire, first branched ray equals head, A III, 5, I, first branched ray 1⅕ to 1¼, caudal 2½ to 2⅘ in rest of fish, deeply forked, slender lobes sharply pointed, least depth of caudal peduncle 2 to 2⅕ in head, pectoral 1⅓ to 1¼, rays I, 17, ventral rays I, 8, fin 1⅛ to 1¼ in head Vent little before anal at ends of depressed ventral

Back and upper surfaces olivaceous, sides and below whitish Very obscure darker longitudinal dark bands along middle of each scale row on back A diffuse gray blotch size of eye at caudal base in small specimen, fades with age so that in large specimens pair of well separated dark spots, opposite, one above and the other below the lateral line result Iris pale brownish Lips and under surface of body pale or whitish Dorsal and caudal pale brownish, former with membranes grayish basally Lower fins pale, all more or less grayish medially

A N S P , No 68,184. Me Poon, Siam Length 182 mm Type Also Nos. 68,185 to 68,189, same data, paratypes Length 154 to 181 mm

An interesting species known by its large prominent lips, the largely concealed maxillary barbel and other structural characters in combination, besides the pair of dark spots at the caudal base in mature specimens

(For Dr Paul Chevey of the Institut Océanographique de l'Indochine.)

INCISILABEO, new subgenus

Differs from subgenus *Labeo* in the notch or transverse groove on the snout, the lower lip with a fringed edge, and the upper lip and edge of the rostral fold entire Pair of maxillary barbels become smaller and concealed with age. Type *Labeo behri*, new species

(*Incisum* notch + *Labeo;* with reference to the groove on the snout separating a very distinct arrangement of the pearl organs)

Labeo behri, new species Figures 175 (head below), 176 (Kemrat)

Depth 3⅗ to 3⅘; head 2⅞ to 3¾, width 1¾ to 2⅒ Snout 2⅞ to 3⅒ in head, eye 4 to 5, 1¼ to 1⅘ in snout, 1⅓ to 2¼ in interorbital, mouth broad, width 2¾ to 4½ in head; maxillary reaches ¾ or nearly opposite front eye edge, length 2⅗ *to* 3½ *in head*, upper labial fold broad, leaves only narrow margin of upper lip exposed, edges of both entire, lower lip with fine marginal fringe all around and front inner area well papillated; edge of lower jaw horny, trenchant keel, young with pair of very minute, inconspicuous rostral barbels, disappearing with age, maxillary barbel half long as eye in young and terminally exposed, with age much smaller and concealed in labial groove, interorbital 2⅘ to 2½ in head, broadly convex; suborbitals moderate, width ⅘ of eye Gill opening extends forward opposite hind eye edge Gill rakers 7 + 32, compressed, pointed, laminate, ⅕ of gill filaments, which equal eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, close set, cultrate, each with more or less of entire oblique grinding surface

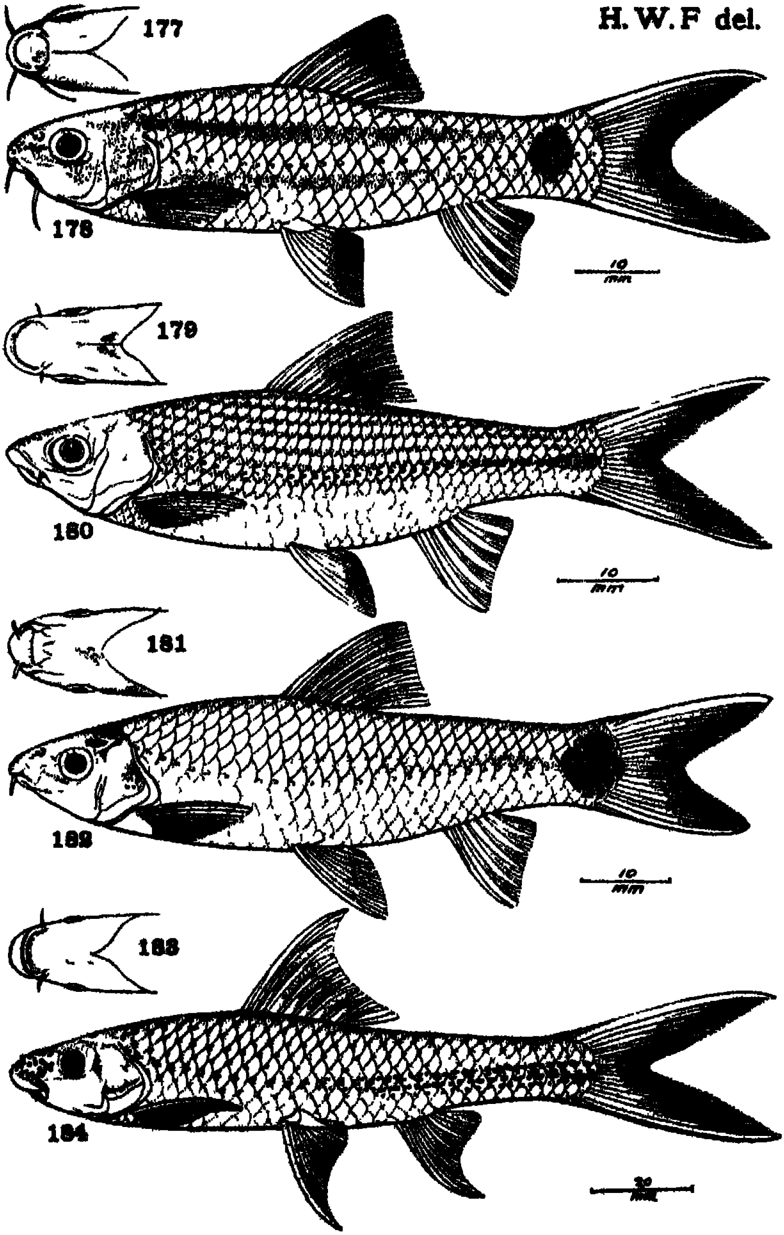
Scales 34 or 35 + 3 or 4 in lateral line, 10 above, 6 below to ventral origin, 6 or 7 below to anal origin, 15 to 24 predorsal with those down its median ridge little defined Ventral with pointed axillary scale 2⅕ to 2⅗ in fin. Caudal base scaly Scales very small and crowded on chest and breast Lateral line complete, little decurved, axial along side of tail, tubes small, short, simple Scales with 24 to 56 apical radiating striae, 4 to 12 short basal striae, circuli fine, basal, become obsolete apically. Band of small, close set pearl organs on end of snout, extend back below nostrils, made up of 4 irregular series; broad band of smaller tubercles across internasal space, in young specimens tubercles fewer and comparatively larger

D IV, 12, I, first simple rays pungent with fourth terminally flexible, first branched ray 1¼ in head to 1⅕ times head, A III, 5, I, first branched ray 1¼ to 1½ in head, caudal 2⅗ to 3 in rest of fish, deeply forked, least depth of caudal peduncle 1⅞ to 2¼ in head, pectoral 1⅕ to 1½, rays I, 18, ventral rays I, 8, fin 1⅕ to 1⅘ Vent slightly before ends of depressed ventrals

Dark or olivaceous brown on back or upper surface, lower sides and under surfaces whitish Above fifth scale of lateral line scale gray black, also one below and sometimes second one Dark gray transverse bar at caudal base Iris brown Lips whitish. Dorsal gray, more contrasted or rays paler in young Caudal brownish Lower fins largely pale brown, medially darker or gray brown.

A N S P, No. 68,190 Kemrat, Siam. Length 208 mm. Type. Also Nos 68,191 to 68,200, same data, paratypes Length 40 to 208 mm.

Besides these a series of 77 specimens with same data, not paratypes, and one example 65 mm. long from Bangkok



177, 178. *Discolabeo fisheri* 179, 180 *Tylognathus davisi*
181, 182 *Tylognathus coatesi* 183, 184 *Tylognathus gracilis*.

Known among Siamese species by its coloration and combination of structural characters

(Named for the late Otto Behr, of Lopez, Pa, to whom the Academy is indebted for many specimens of the natural history of his region)

Tylognathus davisi, new species Figures 179 (head below), 180

Depth 3½, head 3¾, width 2 Snout 3⅓ in head, eye 4, 1⅛ in snout, 1⅘ in interorbital, maxillary reaches ⅞ to eye, length 3¼ in head, upper labial fold broad, its edge and that of upper lip entire, and lower lip with papillate edge, otherwise smooth, small maxillary barbel 1⅛ in eye, largely concealed, interorbital 2¼ in head, suborbitals narrow, width ⅓ of eye Gill opening extends forward nearly opposite hind eye edge

Scales 30 + 2 in lateral line, 6 above, 4 below to ventral origin, 5 below to anal origin, 12 predorsal Ventral with pointed axillary scale 2⅗ in fin Caudal base scaly Small scales on chest and breast Lateral line complete, slightly decurved, median at caudal base, tubes small, slender, simple Scales with 15 apical radiating striae, 6 short basal striae, circuli fine, basal, more or less obsolete apically

D III, 8, I, simple rays slender, entire, first branched ray 1⅛ in head, A III, 5, I, first branched ray 1½, caudal 2½ in rest of fish, deeply forked, slender lobes sharply pointed, least depth of caudal peduncle 2⅛ in head, pectoral 1¼, rays I, 15, ventral rays I, 8, fin 1¼ in head Vent close before tip of depressed ventrals

Back and upper surfaces brown, sides below and under surfaces whitish On tail narrow dark axial line, ending in elongate black blotch, about long as snout, at base of caudal Iris gray Lips whitish On back forming slightly darker longitudinal streaks at scale junctures, about 6 distinguished above lateral line Dorsal pale brown, each membrane medially rather dark gray Caudal brownish, little yellowish basally Lower fins all pale or whitish

A N S P, No 68,201 Kemrat, Siam Length 78 mm Type.

Apparently related to *Tylognathus siamensis* Beaufort 1927, but that species described with 35 or 36 scales, 5 scales above lateral line, uniform, dorsal with blackish border and a row of oblong blackish spots on membranes between fin rays, forming a cross bar, specimen 135 mm, from Payao Swamp

(For Mr William Baldwin Davis, of Philadelphia, who contributed numberous local fishes to the Academy)

Tylognathus coatesi, new species Figures 181 (head below), 182

Depth 4, head 4, width 1⅘. Snout 3 in head, eye 4⅛, 1⅜ in snout, 1⅞ in interorbital; mouth small, transeverse, width 4½ in head, upper lip with about 16 plicae, tip of each free and forming more or less free edge, their surfaces entirely finely papillate; edge of lower lip papillate and uneven, though outer surface smooth, rictal groove moderate and converging a little toward isthmus, rather robust rostral barbel 1⅓ in eye, interorbital 2⅜ in head; suborbitals narrow, width about ⅓ of eye Gill opening extends forward opposite hind eye edge

Scales 29 + 3 in lateral line, 5 above, 4 below to ventral origin, 4 below *to anal origin, 10 predorsal* Ventral with free, pointed axillary scale, 2⅓ in fin Caudal base scaly Chest and front of breast before pectorals naked Lateral line continuous, slightly decurved, midway at caudal base, tubes small, simple, slender, well exposed Scales with 29 radiating apical striae, 15 short basal striae and many as 10 more incomplete auxiliaries, circuli fine, basal, apically obsolete

D III, 8, I, front simple rays pungent, slender, smooth, third flexible terminally, first branched ray 1 in head, A III, 5, I, first branched ray 1½, caudal 2⅔ in rest of fish, deeply forked, lower lobe little shorter, least depth of caudal peduncle 2 in head, pectoral 1⅓, rays I, 14, ventral rays I, 8, fin 1¼ in head Vent little in advance of anal, opposite tips of depressed **ventrals.**

Back and upper surfaces light brown, scale pockets showing through as darker brown though in little contrast Along side of tail medially an underlaid ill defined lateral band ending at caudal base in a contrasted blackish blotch larger than eye Iris gray Rostral barbel and lips pale Dorsal pale brown, each membrane with slightly darker or dark gray median streak Caudal pale brown, with dull yellowish tinge basally Lower fins whitish

A N S P, No 68,202 Bangkok, Siam Length 83 mm Type

Known by the possession of only two barbels, the rostral pair, the scaleless breast, and structural characters as noticed above

(For Josiah L Coates, an early contributor to the Academy's collection of fishes)

Tylognathus gracilis, new species Figures 183 (head below), 184

Depth 4½ to 4⅔, head 3⅞ to 4¼, width 1¼ to 1⅜ Snout 2½ to 2⅘ in head, eye 5 to 6, 2 to 2¼ in snout, 2¼ to 3 in interorbital, mouth broad, transverse, width 2⅜ to 3⅓ in head, maxillary extends ¾ to ⅞ to eye, length 2⅘ to 3⅓ in head; rostral fold broad, edge entire, leaving narrowly exposed upper lip entire; lower lip with broad free inner face entire, outer face with broad marginal band of papillae, lower jaw edge trenchantly coriaceous, broad, single maxillary barbel each side, partly concealed and little less than eye; interorbital 2 to 2⅓ in head, broadly convex, rather low, suborbitals narrow, width about ⅔ of eye Gill opening extends forward opposite hind eye edge Gill rakers 6 + 25, short, compressed, laminated, pointed, ⅓ of gill filaments, which equal eye Pharyngeal teeth 2, 4, 5 — 5, 4, 2, small, compact, compressed, cultrate, with broad, smooth grinding surfaces

Scales 28 or 29 + 2 or 3, 6 above, 3 below to ventral base, 4 below to anal origin, 10 or 11 predorsal Ventral with free pointed axillary scale 2⅓ to 2⅔ in fin Caudal base scaled Chest and breast finely and closely scaled. Lateral line complete, distinct, axial along side of body, tubes small, simple, little exposed Scales with 43 or 44 apical radiating striae; 3 to 5 short basal striae, circuli fine, basal, obsolete apically Five irregular rows of pearl organs around end of snout to below nostrils Some examples even show cheeks and most of upper surface of head minutely tuberculate

D III, 8, I, simple rays slender, first branched ray 1⅓ to 1⅓ times head; A. III, 5, I, first branched ray 1⅓ to 1⅓ in head, caudal 2⅔ to 2⅘ in rest of fish, deeply forked, long slender lobes sharply pointed, least depth of caudal peduncle 2⅗ to 2⅘ in head; pectoral 1 to 1¼, rays I, 16, ventral rays I, 8, fin 1⅒ to 1⅓ in head Vent at last fifth to third in space between ventral and anal origins

Back gray brown, each scale with dark blotch, and along sides of body each scale with small and still darker spot On side of tail small dark spots form, with others present in interspaces, 3 distinct nearly blackish longitudinal lines At caudal base a broad axial dark gray band continued out over middle of caudal fin Sides of head with gray and olive tints, below whitish Iris gray Lips and barbels pale to whitish Dorsal grayish, each membrane with gray black streak medially. Caudal brownish, except for dark gray median band as described Lower fins all pale to whitish

A N S.P , No 68,203 Me Poon, Siam Length 233 mm. Type Also Nos 68,204 to 68,218, same data, paratypes Length 164 to 228 mm One, 153 mm , Kemrat

A handsome slender species, related to *T quadrilineatus* Fowler 1935, but with long falcate fins and three dark lines on the caudal peduncle

(*Gracilis* slender)

Tylognathus melanotaenia Fowler

Three, 142 to 158 mm , Kemrat As this is known only from the type I have the following notes Depth 3⅔ to 4; head 4 to 4¼, width 1⅔ to 1⅘ Snout 2⅔ to 3 in head, eye 4½ to 5, 1½ to 1⅔ in snout, 2 to 2⅓ in interorbital, maxillary reaches ⅔ to ⅗ to eye, length 2⅗ to 3 in head; interorbital 2 to 2⅓ Gill rakers 5 + 25 Right pharyngeal teeth 5, 4, 2. Scales 27 to 29 + 3 in lateral line, 11 or 12 predorsal Ventral axillary scale 2 to 2½ in fin Small scales crowded on chest and breast Pearl organs (scars) in 4 or 5 irregular rows around end of snout, extend below nostrils; head above and median predorsal ridge with minute, inconspicuous, numerous tubercles or papillae First branched dorsal ray 1⅕ to 1⅓ times head, first branched anal ray 1⅕ to 1¼ in head, caudal 2⅓ to 2⅘ in rest of fish; least depth of caudal peduncle 1⅘ to 2 in head, pectoral 1 to 1⅕, ventral 1 to 1⅒ Each specimen with subopercle brilliant red when first received.

DISCOLABEO, new genus

Body moderately long, compressed. Head moderate, little compressed Snout obtuse Eye small, elevated, entirely in front half of head. Mouth inferior, broad Lips not greatly developed Two pairs of barbels, well developed Mandible modified, disk like, with velum behind Nostrils together, little nearer eye than end of snout Gill opening lateral, with broad isthmus Pseudobranchiae moderate. Gill rakers minute. Scales rather large, well exposed, in even longitudinal rows. Lateral line complete, simple Dorsal origin but slightly premedian, branched rays 8 Anal small, entirely behind dorsal, branched rays 5. Caudal large, forked Pectoral low, less than head. Ventral inserted little behind dorsal origin, moderate Type *Discolabeo fisheri*, new species.

Small cyprinids allied to *Tylognathus*, remarkable for the mandibular disk and somewhat contrasted coloration

(*Discus* disk + *Labeo*)

Discolabeo fisheri, *new species* *Figures 177 (head below), 178*

Depth 3¾, head 3⅝ to 3¾, width 1⅞ Snout 3⅛ to 3¼ in head, eye 4, 1⅓ to 1½ in snout, 1⅓ to 1½ in interorbital, maxillary not quite reaching opposite front eye edge, length 3⅓ to 3¾ in head, mouth broad, width 4 to 4½, upper lip entire, lower broadly interrupted and entering broad rounded mental disk with broad, free, entire edge behind, rostral barbel ⅞ to equal to eye, maxillary barbel 1⅓ to 1½ times eye, interorbital 2¼ to 2½ in head, low, broadly convex, suborbitals narrow, width about ⅓ of eye Gill opening extends forward about opposite hind eye edge Gill rakers very short feeble rudiments, about ⅓ of gill filaments, apparently 20 on lower part of arch Gill filaments about ⅔ of eye Right pharyngeal teeth 5, 4, 2, small, slender, ends curved, with entire, concave grinding surfaces

Scales 27 or 28 + 2 or 3 in lateral line, 5 above, 4 below to ventral base, 4 below to anal origin, 10 predorsal Ventral with pointed axillary scale 3 in fin Caudal base scaled Chest and breast covered with small scales Lateral line complete, distinct, nearly straight and axial along side of body, tubes small, simple, little exposed Scales with 16 apical striae, 2 short basal striae, circuli fine, basal, obsolete apically Pearl organs (scars) as 2 or 3 irregular series around end of snout

D iii, 8, i, simple rays slender, entire, first branched ray 1⅓ in head, A. iii, 5, i, first branched ray 1⅔, caudal 2¼ to 2⅔ in rest of fish, deeply forked, lobes sharply pointed, least depth of caudal peduncle $1\frac{9}{10}$ to 2 in head, pectoral 1⅓, rays i, 13, ventral rays i, 8, fin 1⅓ to ½ in head Vent little before anal origin, at depressed ventral tip

Brown above, paler to whitish below or underneath Two very obscure, ill defined or diffuse, slightly darker, longitudinal streaks Side of head and body all more or less dusted with dark dots Black blotch, larger than eye at caudal base Iris gray Barbels and lips whitish Dorsal pale or very light brownish basally, apex broadly black Caudal brownish Lower fins all very pale brown to whitish

A.N.S.P., No 68,219 Tachin, Siam Length 43 mm Type Also No 68,220, same data, paratype. Length 42 mm

The characters are included in the generic account

(For Dr J C. Fisher, an early contributor to the natural history collections of the Academy)

Garra taeniatops Fowler

Series of 195 specimens, 28 to 87 mm, Me Poon Many with the dark or blackish lateral band, and the dark border of the dark shade on the back each edged with black, and in sharp contrast Lower caudal lobe with a median streak at the base of the lower lobe. Lateral line indistinct and not always evident with age, though in small or young mostly evident or quite distinct. One example, abnormal with greatly swollen predorsal, is 70 mm long

Garra fasciacauda, new species Figures 187 (head below), 188

Depth 5⅕ to 5⅓, head 3⅗ to 4⅖, width 1⅓ to 1⅞ Snout 1⅗ to 2 in head; eye 4 to 5¾, 2 to 2½ in snout, 1⅗ to 2 in interorbital, mouth width 2⅛ to 2⅞ in head, upper lip broadly papillate, edge with 16 to 20 plaits and short free end of each with slight terminal notch, lower lip broad disk, also largely finely papillate around front border, more narrowly so behind, rostral barbel long as eye; interorbital 2 to 2⅕ in head, low, scarcely convex; suborbitals narrow, width little less than half of eye Gill opening lateral, extends forward opposite hind eye edge Gill rakers 8 + 16, short, more or less uniform points, ⅕ of gill filaments, which equal eye Pharyngeal teeth 2, 3 or 4, 5 — 5 or 6, 3, 2, compressed, small, close set, without hooks, moderate, entire, oblique granding surfaces

Scales 28 + 2 or 3 in lateral line, 4 above, 3 below to ventral origin, 4 below to anal origin, 10 predorsal Ventral with free pointed axillary scale 2⅔ to 2¾ in fin Caudal base scaly Chest and breast naked Lateral line complete, nearly straight, axial along side of body, tubes small, slender, simple. Scales with 37 to 58 apical radiating striae, 12 to 21 short basal striae, circuli fine, basal, obsolete apically Pearl organs moderate, over end of snout back into internasal space and below nostrils on preorbital, pair of enlarged, wide set, laterally directed horny tubercles each side of snout end

D iii, 8, i, simple rays in front slender and smooth, first branched ray 1⅕ to 1⅗ times head, A iii, 5, i, first branched ray 1⅗ to 1¼ in head, caudal 2⅕ to 3⅛ in rest of fish, well forked, lobes sharply pointed, least depth of caudal peduncle 1⅞ to 2⅕ in head; pectoral 1, rays i, 15, ventral rays i, 8, fin 1 to 1⅙ in head Vent opposite last fourth or fifth of depressed ventrals

Body brown above, lower sides and under surfaces pale to whitish Pale spot, nearly whitish, and little smaller just before eye Iris gray Lips, barbel and disk whitish Along side of body, from behind head, broad gray black lateral band, wider than eye, contains lateral line and reflected narrowly out over median caudal rays Above band narrow parallel paler streak separates darker color of back Dorsal grayish, paler basally, and each membrane medially with dark gray streak along front of each ray. Caudal pale to whitish, each lobe with narrow gray black submarginal band Lower fins all more or less whitish, dusted with gray brown medially

A N S P , No 68,222 Kemrat, Siam Length 110 mm Type Also Nos 68,223 to 68,231, same data, paratypes. Length 75 to 105 mm Also 28 others, same data, not included as paratypes

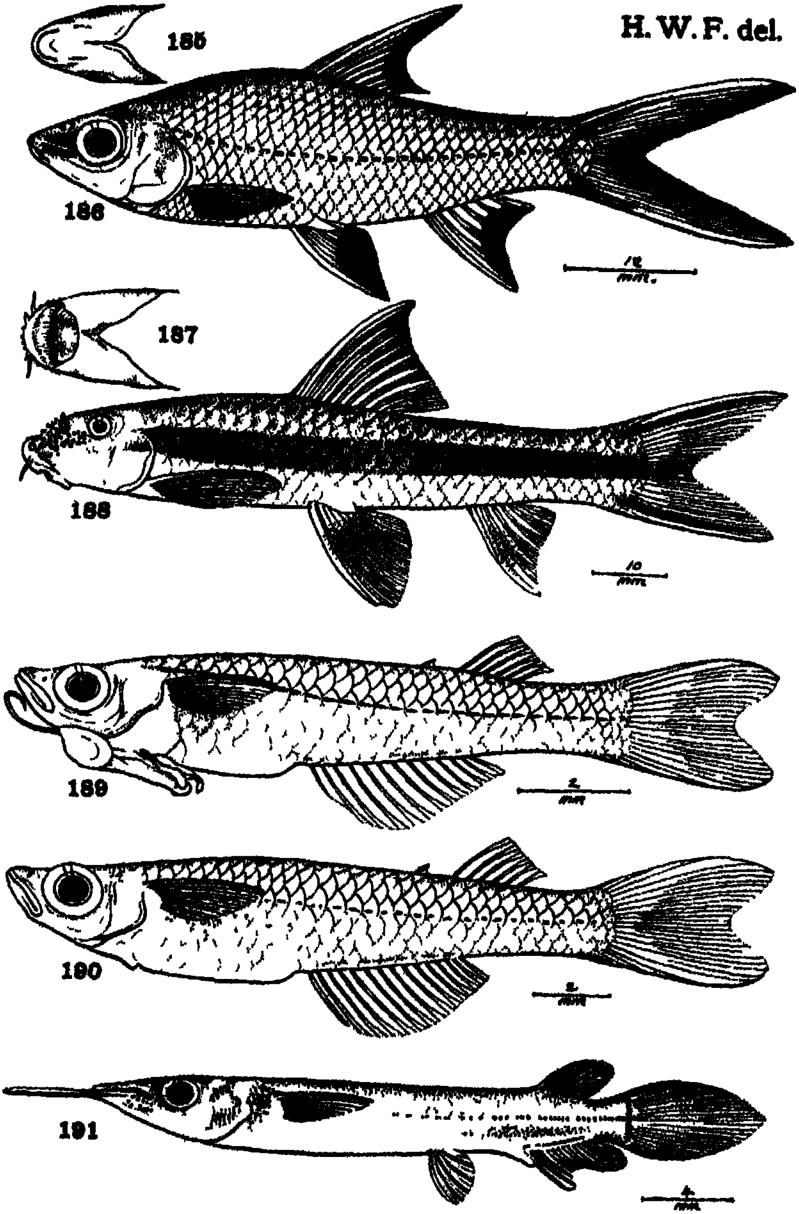
Related to *Garra taeniatops* Fowler, especially in its pearl organs It differs in the dorsal less contrasted and not banded, its very slender and trim body, and each caudal lobe with a narrow black band nearly or quite to its hind edge The species is also of moderate size

(*Fascia* band + *cauda* tail)

LEUCISCINAE

Barilius harmandi (Sauvage)

Two, 133 to 222 mm , Me Poon



185, 186 *Balantiocheilus melanopterus* 187, 188 *Garra fasciacauda*
189, 190 *Phenacostethus thai* 191 *Dermogenys siamensis*

CYPRINODONTIDAE

Panchax panchax (Buchanan-Hamilton)

Two, 28 to 29 mm , Bangkok

BELONIDAE

Strongylura leiura (Bleeker)

Three, 204 to 246 mm., Tachin

Xenentodon canciloides (Bleeker)

Depth 11½ to 14, head 2⅜ to 2⅘, width 7 to 8 Snout 1½ to 1⅗ in head from snout tip, eye 7 to 8⅕ in snout, 2⅓ to 3⅛ in postocular region of head, 1⅛ to 1⅙ in interorbital, maxillary reaches below ⅕ to ¼ of eye, canines in 14 to 16 pairs, subvertical, interorbital 2 to 2½ in postocular region, deep groove along top of head conspicuous, its width half of eye No gill rakers

Scales about 200 to 205 in axial lateral series to caudal base and 7 or 8 more on latter, 20 or 21 scales between dorsal origin and lateral line; 110 to 146 predorsal scales forward to occiput Lateral line low along side of body, after anal slopes up until median along side of caudal peduncle, without keel Opercle naked

D II, 13 to II, 15, first branched ray 3⅘ to 4 in lateral head length; A II, 13 or II, 14, first branched ray 3⅓ to 4⅖, caudal 3⅗ to 3⅞, convex behind, least depth of caudal peduncle about equals eye, pectoral 3⅗ to 4⅔ in total head length, rays I, 9, ventral rays I, 5, fin 1⅘ to 2 in postocular space Vent rather close before anal

Pale brown, lower sides and under surfaces white, evidently silvery white in life Iris gray Lateral mandibular cutaneous margin black in young, brownish with age Fins all pale brownish, dorsal and caudal grayish marginally

Eight, 111 to 260 mm , Bangkok, one, 212 mm , Kemrat

HEMIRAMPHIDAE

Hemiramphus erythrorinchus Le Sueur

One, 228 mm , Paknam, five, 158 to 213 mm , Tachin Branched anal rays 10 or 11

Hyporhamphus neglectus (Bleeker)

Two, 212 to 227 mm , Rayong, eight, 110 to 128 mm , Tachin.

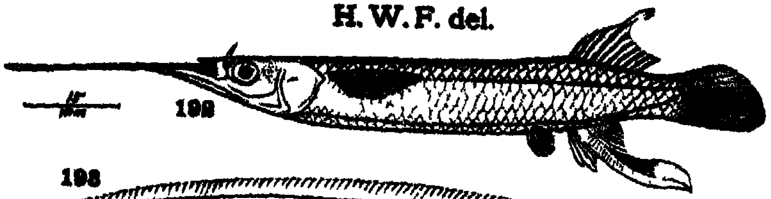
Zenarchopterus dunckeri Mohr * Figure 192

Eight, 75 to 140 mm , Rayong

Dermogenys siamensis Fowler Figure 191 (Bangkok)

Two, 22 to 36 mm , Bangkok, one, 35 mm , Paknam. Mohr 1936 has suppressed this form, along with *D. burmanicus* Mukerji 1935, as synonyms of *D pusillus* Van Hasselt In this I am not altogether convinced as my specimens show only the first three anal rays simple and longer than those following, and in *D. burmanicus* at least five are shown in the figure of the anal fin of the male In commenting on ***Dermogenys pusillus*** Van Hasselt

H. W. F. del.



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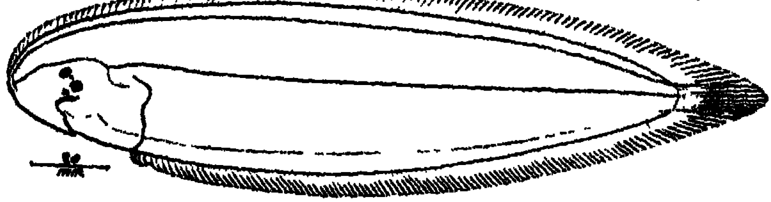

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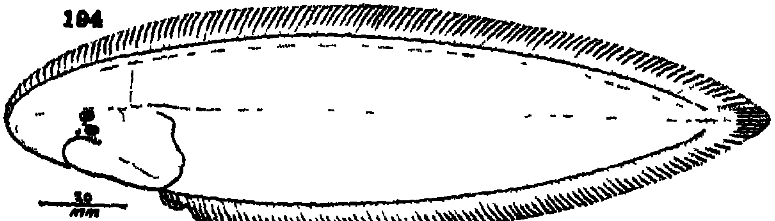

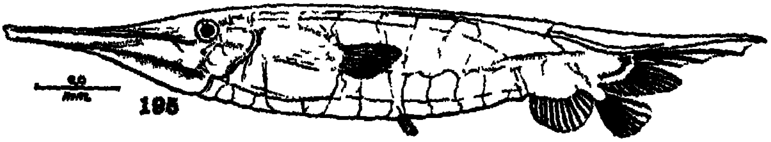

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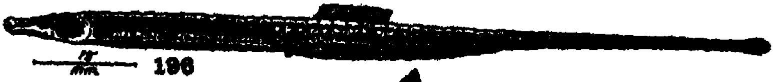

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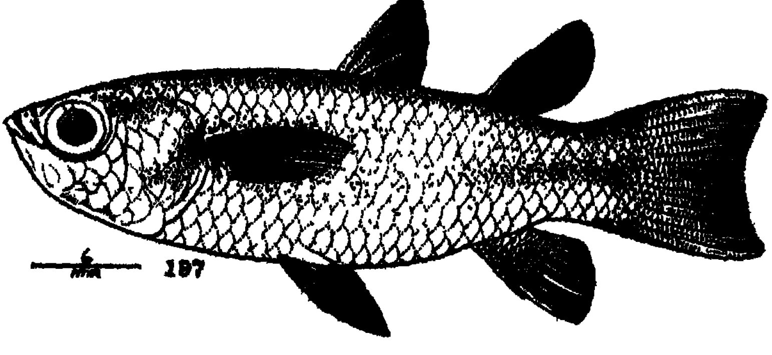


197

192 *Zenarchopterus dunckeri* 193 *Cynoglossus microlepis*
194 *Cynoglossus macrolepidotus* 195 *Centriscus scutatus*
196 *Syngnathus djarong* 197 *Mugil vaigiensis*

may she be reminded that Sherborn (Index Animalium) gives Van Hasselt as the author in 1823 and 1824, likewise for the same genus. Further it may be well for her to remember that Cuvier wrote *Hemi-Ramphus* in 1817 and that the family and subfamily names evolve as Hemiramphidae and Hemiramphinae respectively. Still more she has no excuse for writing "*Dermogenys burmanensis* Mukerji 1935" for *D. burmanicus*, as originally spelled, thereby creating the contention for a different name. Without dealing with the generic problems involved I accept the suppression of *Zenarchopterus kneri* Fowler 1934 as a synonym of *Z. dunckeri* Mohr 1926. Contention for *Z. atrodorsalis* Fowler 1934 as a synonym of *Z. pappenheimi* Mohr 1926, and *Z. basudensis* Fowler 1934 merged with *Z. kampeni* Weber 1913, much less the preoccupied *Z. brevirostris* (Gunther) 1866, are far from established.

EXOCOETIDAE

Parexocoetus brachypterus (Richardson) *

Two, 110 to 116 mm., Rayong; two, 96 to 115 mm., Paknam.

Cypselurus arcticeps (Gunther)

Two, 175 mm., Tachin. A. ii, 7.

PSETTODIDAE

Psettodes erumei (Schneider)

One, 193 mm., Rayong.

PLEURONECTIDAE

Pseudorhombus arsius (Buchanan-Hamilton)

One, 139 to 170 mm., Rayong; one, 143 mm., Bangkok.

SOLEIDAE

Brachirus orientalis (Schneider)

One, 91 mm., Bangkok.

Brachirus aeneus (H. M. Smith). Figures 198, 200 (Kemrat), 201, 202 (Pitsanulok).

Three, 37 to 50 mm., Kemrat; two, 76 to 80 mm., Pitsanulok.

Zebrias zebra (Bloch). Figure 203.

One, 150 mm., Paknam.

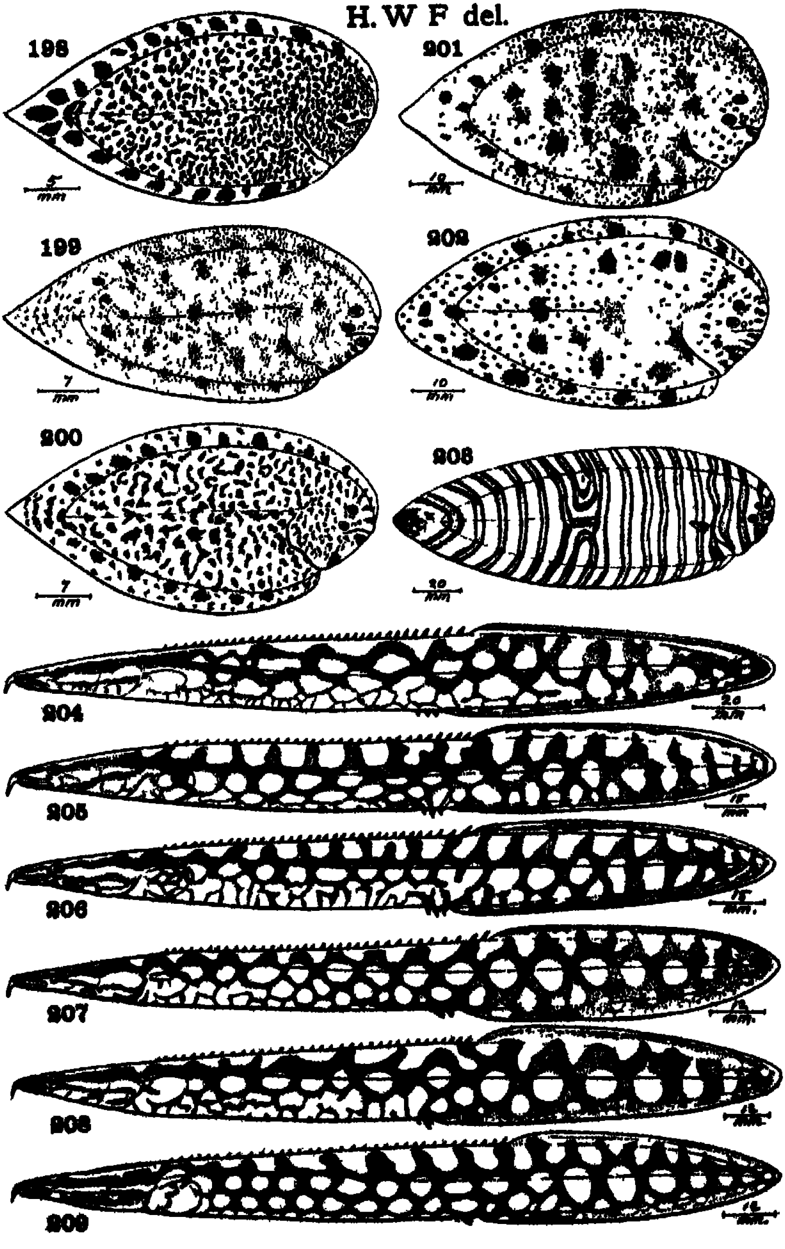
CYNOGLOSSIDAE

Paraplagusia bilineata (Bloch) *

Three, 165 to 168 mm., Rayong.

Cynoglossus lingua (Buchanan-Hamilton)

Six, 122 to 173 mm., Bangkok.



198 to 202 *Brachirus aeneus* 203 *Zebrias zebra*
204 to 209 *Mastacembelus favus*

Cynoglossus arel (Schneider) *

Depth 5⅓ to 6⅓; head 4 to 4½ Snout 2½ in head; upper eye 11 to 13, 3⅘ to 4⅗ in snout, greater than interorbital; rostral hook moderate, extends behind mandibular symphysis for space equal to ⅘ eye, maxillary extends ½ eye diameter behind eye, much nearer gill opening than end of snout; nostrils on eyed side, upper pore in front part of interorbital space, lower in tubule little before eye

Scales ctenoid on eyed side, cycloid on blind side Two lateral lines on eyed side, scales in median or axial from above gill opening to caudal base 63 to 65, 10 between lateral lines No lateral line on blind side

D 120 *to* 123, *fin* height 4 in head, A. 103 *to* 104, *fin* height 4⅓ to 4⅔; caudal 2⅓ to 2⅔, ends in slender median point.

Uniform pale brown on left or eyed side, right side whitish Iris gray Fins pale.

Three, 130 to 142 mm, Tachin

Cynoglossus microlepis (Bleeker) * Figure 193.

Depth 4⅓ to 4⅔, head 4⅞ Snout to upper eye 2¼ to 2¾ in head, upper eye 13⅓ to 15, 4⅔ to 5 in snout, slightly greater than interorbital, rostral hook long, extends back over lower face of mandible opposite hind edge of lower eye, maxillary reaches opposite or little behind hind edge of lower eye, or mouth corner much nearer gill opening than snout end; upper nostril pore in interorbital slightly behind hind edge of upper eye, lower in short tube close to upper lip and below front part of upper eye, interorbital narrow, concave

Scales ctenoid on both sides of body Left or colored side with 3 lateral lines, on median or axial 110 to 120 scales from above gill opening to caudal base, 20 or 22 between median and upper lateral line, 24 between median and lower lateral line. Single median or axial lateral line on blind side

D 113 to 115, fin height 3⅓ to 5 in head, A´ 95, fin height 3⅔ to 4⅗; caudal 1⅓ to 1½, ends in median point behind

Left side brown, right side pale to whitish. Fins grayish on upper surfaces, whitish on lower Iris gray

Two, 160 to 263 mm, Bangkok

Cynoglossus borneensis (Bleeker).*

Seven, 78 to 197 mm, Bangkok. Rictus nearer gill opening than end of snout On left side 16 to 18 scales between upper and median lateral line On right side single lateral line.

Cynoglossus macrolepidotus (Bleeker) * Figure 194.

Depth 4¼, head 3⅘ Snout to upper eye 2⅘ in head; upper eye *15*, 4⅓ in snout, greater than interorbital, rostral hook encroaches very little on mandible, maxillary reaches very slightly behind eye, with rictus slightly nearer gill opening than end of snout; upper nostril pore at front of interorbital above front edge of lower eye, lower in short tube near upper lip and opposite front edge of upper eye

Scales ctenoid on left or ocular side, smooth on right side. Lateral lines 2 on left side, medial with 52 scales from above gill opening to caudal base; 7 scales between No lateral line on right side.

D. 106, fin height 4 in head, A 84, fin height 3¼, caudal 2¾

Left or eyed side brown, right side whitish Fins grayish on eyed side, whitish on right Eyes gray.

One 180 mm Bangkok

Cynoglossus puncticeps (Richardson)

Two, 74 to 82 mm, Bangkok, three, 61 to 98 mm, Paknam; nine, 78 to 104 mm., Tachin. Scales 16 to 18 between median and upper lateral line on eyed side

Cynoglossus cynoglossus (Buchanan-Hamilton)

One, 103 mm, Tachin, eight, 73 to 94 mm, Paknam, 33 specimens, 62 to 100 mm, Bangkok

CENTRISCIDAE

Centriscus scutatus Linnaeus * Figure 195

One, 160 mm, Rayong

SYNGNATHIDAE

Syngnathus djarong Bleeker Figure 196

One, 122 mm, Bangkok

PHALLOSTETHIDAE

Phenacostethus thai, new species Figures 189 (male), 190 (female)

Depth 4⅗ to 4⅘, head 4 to 4⅕, width 1⅘ to 2 Snout 3⅘ to 4 in head from snout tip, eye 2⅗ to 3⅗, greater than snout, 1 to 1⅓ in interorbital, maxillary reaches slightly beyond front eye edge, length 2⅘ to 2⅞ in head from snout tip, mandible distinctly protruded, interorbital 1⅘ to 2, depressed, with eye slightly impinging on upper profile

Scales 28 or 29 + 2 or 3 in axial lateral series, 7 transversely above anal origin, about 14 predorsal Caudal base scaly, fins otherwise and head naked

D I – 6, i, small detached spine less than pupil in length, first ray 2 to 2⅕ in total head length, A i, 13, i or i, 14, i, third branched ray 1½ to 1⅘, caudal 3⅗ to 3⅘ in rest of fish, emarginate, least depth of caudal peduncle 2 to 2⅓ in head, pectoral 1⅓ to 1¼, rays 13 Male with priapium elongate, excluding toxactinium little longer than head, toxactinium, or hook-like structure at front of pulvinulus, extends forward below chin, pulvinulus disk-like below eye and slightly longer than its diameter, infra-pectoral expansion below fin base large as eye, abdominal ridge distinct

Largely pale uniform brownish in alcohol Iris gray. Median axial line dark to blackish brown, and another along anal base. Patch of dark dots below depressed pectoral Fins all pale to whitish

A N S.P., No 51,352. Bangkok, Siam August 1923 Dr. H M Smith. Length 17 mm. Type Also Nos. 51,353 to 51,360, same data, paratypes Length 15 to 18 mm. Of these 4 are males

Apparently very closely related to *P smithi* Myers 1928, but my specimens with a larger caudal or less than 4 in the rest of the fish (compared with 4⅔ in figure of *P smithi*), anal origin midway, or but very slightly postmedian in female (anal origin midway between hind edge of eye and caudal base in *P smithi*), longer pectoral reaching over ⅔ to anal origin, and depth less than 5 As these characters seem to me distinctive, possibly they may in part at least be due to preservation and may eventually be found less contrasted than now appears.

(*Thai,* the ancient name of the Siamese)

SPHYRAENIDAE

Sphyraena jello Cuvier

One, 170 mm , Tachin, four, 81 to 83 mm , Rayong

MUGILIDAE

Mugil vaigiensis Quoy and Gaimard * Figure 197 (Rayong)

One, 42 mm , Rayong, one, 53 mm , Bangkok

Mugil oligolepis Bleeker Figure 210.

Seven, 68 to 142 mm , Tachin Scales 24 to 28 + 3 in median lateral series, 20 predorsal Pectoral scale in axil 3 to 3⅘ in fin Soft vertical fins mostly scaly A III, 9, I Pectoral 1⅓ to 1⅖ in head

Mugil troscheli Bleeker * Figure 211

One, 70 mm , Tachin

Mugil longimanus Gunther Figure 212

Twenty, 110 to 157 mm , Tachin

Mugil seheli Forskål * Figure 213

Series of 133 specimens, 34 to 116 mm , Rayong

ATHERINIDAE

Atherina valenciennei Bleeker

Two, 89 to 90 mm , Paknam, 19 specimens, 48 to 97 mm., Tachin.

Atherina duodecimalis Valenciennes

Series of 220 specimens, 48 to 86 mm , Rayong; one, 48 mm., Bangkok.

POLYNEMIDAE

Eleutheronema tetradactylum (Shaw)

One, 111 mm , Paknam; three, 73 to 163 mm., Tachin.

Polydactylus sextarius (Schneider) Figure 216 (Rayong)

One, 160 mm., Bangkok; seventeen, 63 to 95 mm , Rayong.

Polydactylus dubius (Rüppell).

Ten, 112 to 188 mm , Bangkok; one, 105 mm., Paknam.

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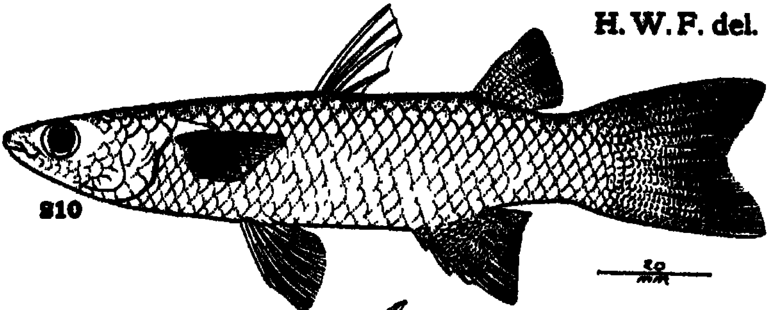

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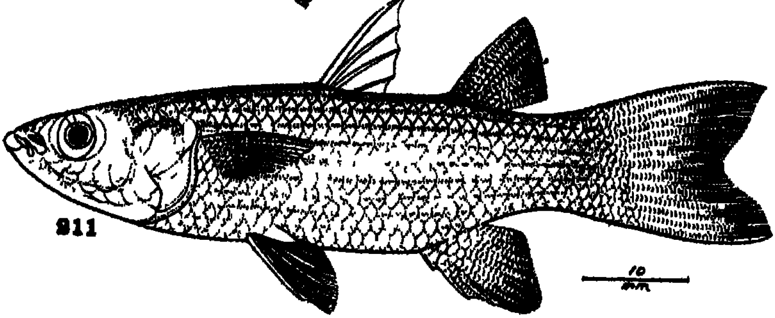

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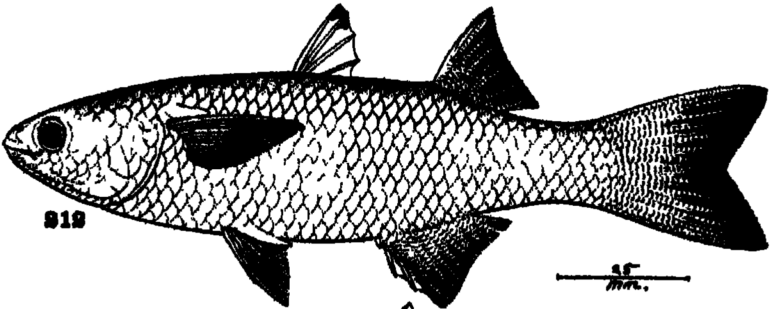

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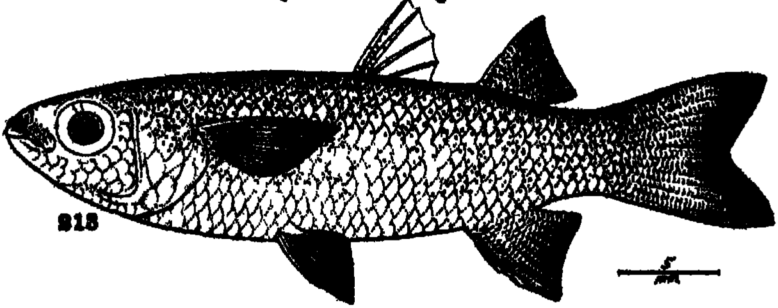

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210. *Mugil oligolepis* 211 *Mugil troscheli*
212. *Mugil longimanus* 213 *Mugil seheli*

HOLOCENTRIDAE

Holocentrus ruber (Forskål)

One, 177 mm , Bangkok

MASTACEMBELIDAE

Rhynchobdella aculeata (Bloch)

One, 215 mm , Bangkok, nine, 104 to 190 mm , Tachin, five, 95 to 253 mm , Me Poon, two, 92 to 112 mm , Kemrat

Mastacembelus favus (Hora) Figures 204 (Me Poon), 205 to 209 (Bangkok)

One, 223 mm , Me Poon, five, 170 to 210 mm., Bangkok

ANABANTIDAE

Anabas testudineus (Bloch)

Eight, 60 to 102 mm , Pitsanulok, five, 48 to 79 mm , Tachin, nineteen, 55 to 90 mm , Me Poon

Trichopodus pectoralis Regan

One, 143 mm , Bangkok, two, 93 to 100 mm , Pitsanulok, five, 60 to 98 mm , Me Poon, one, 83 mm , Kemrat These identified tentatively as I have been unable to find very salient characters to distinguish them from *T trichopterus*, except the generally shallower or narrower body depth and the color pattern In small specimens the dark bands cross completely over the under side of the head as in *T trichopterus*

Trichopodus microlepis (Gunther) Figure 214 (Me Poon)

Eleven, 90 to 156 mm , Bangkok; three, 40 to 101 mm , Me Poon, one, 62 mm , Tachin

Trichopodus trichopterus (Pallas)

Twelve, 25 to 117 mm , Bangkok, twenty-eight, 33 to 87 mm , Me Poon, five, 38 to 100 mm , Pitsanulok, twenty, 35 to 73 mm , Rayong Sometimes the median lateral dark spot is double though usually only on one side of the fish

Trichopsis harrisi Fowler

Four, 32 to 44 mm , Bangkok

Trichopsis vittatus (Cuvier)

One, 43 mm , Me Poon Anal spines 7 and no dark blotch at dorsal base or dark longitudinal line along lower side of head

CHANNIDAE

Channa striata (Bloch)

One, 52 mm , Bangkok; seven, 113 to 160 mm , Pitsanulok, two, 71 to 96 mm , Tachin, one, 167 mm , Kemrat

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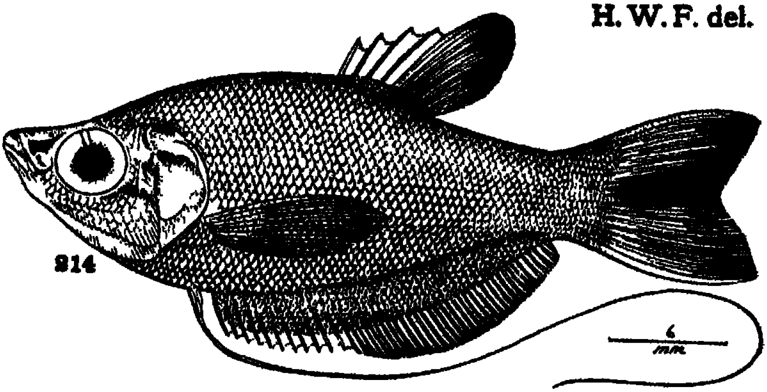

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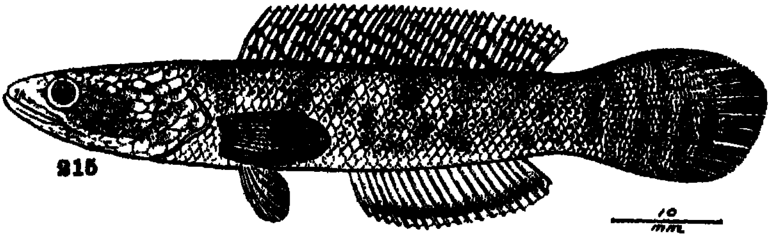

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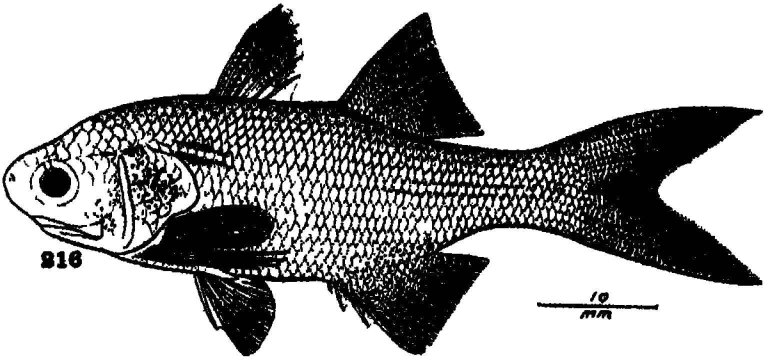

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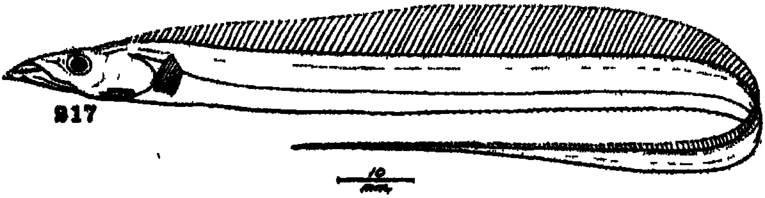


217

214 *Trichopodus microlepis* 215 *Channa melasoma*
216 *Polydactylus sextarius* 217 *Trichiurus muticus*

Channa lucius (Cuvier)

Five, 134 to 213 mm, Bangkok, four, 27 to 148 mm., Pitsanulok; eight, 65 to 122 mm, Me Poon

Channa melasoma (Bleeker) * Figure 215 (Me Poon)

Seven, 60 to 147 mm, Kemrat, 52 specimens, 30 to 128 mm, Me Poon

Channa micropeltes (Valenciennes)

Fifteen, 37 to 43 mm, Kemrat.

SCOMBRIDAE

Rastrelliger kanagurta (Ruppell)

One, 110 mm., Bangkok, forty-two, 89 to 112 mm, Rayong, fifty-three, 112 to 130 mm, Tachin

Scomberomorus commerson (Lacépède)

One, 153 mm, Bangkok; one, 81 mm, Paknam, one, 143 mm, Rayong

TRICHIURIDAE

Trichiurus muticus Gray Figure 217 (Bangkok)

Three, 145 to 230 mm., Bangkok, one, 158 mm, Tachin

ISTIOPHORIDAE

Istiophorus gladius (Broussonet) Figure 218

The accompanying figure is modified from a photograph and a detailed sketch by Y Sial, sent to Mr. de Schauensee under date of December 10, 1935 The fish was caught at Klong Yai, near Kok Kong, and reported as rare It measured 148 cm in total length, and the dorsal fin 50 cm in height

CARANGIDAE

Scomberoides sancti-petri (Cuvier) * Figure 219 (Paknam)

One, 165 mm, Rayong, nine, 137 to 187 mm, Paknam

Selar boops (Cuvier) Figure 220

Eight, 61 to 168 mm., Rayong

Megalaspis cordyla (Linnaeus)

One, 143 mm, Paknam; five, 81 to 118 mm, Tachin; eight, 86 to 150 mm, Rayong

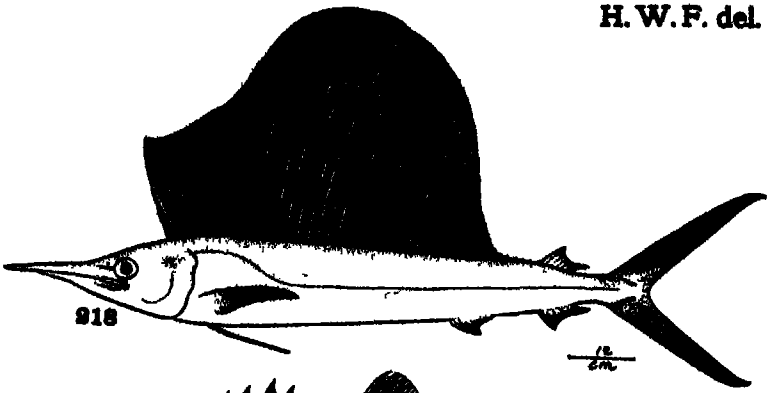
Alepes melanoptera Swainson Figure 221.

One, 101 mm., Paknam

Alepes macrurus (Bleeker)

One, 162 mm, Rayong Scutes in straight section of lateral line 57

H. W. F. del.



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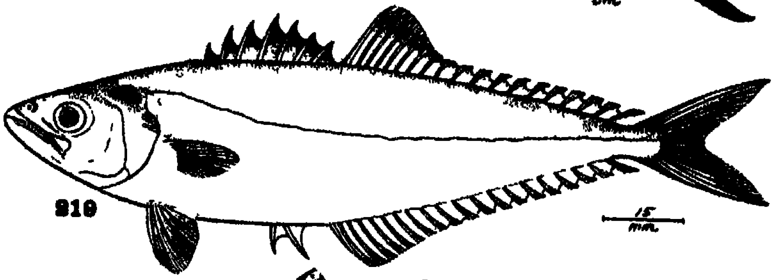

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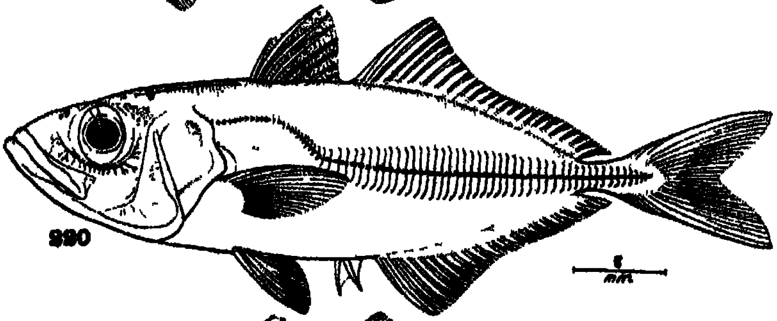

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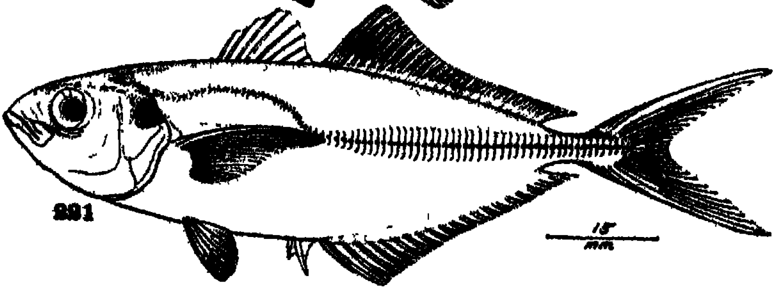


221

218 *Istiophorus gladius.* 219 *Scomberoides sancti-petri*
220. *Selar boops* 221 *Alepes melanoptera*

Alepes djedaba (Forskål)

Four, 123 to 146 mm., Bangkok, one, 127 mm., Rayong; three, 48 to 50 mm., Paknam, 25 specimens, 44 to 100 mm., Tachin, one, 59 mm., Pitsanulok

Alepes kalla (Cuvier)

Four, 114 to 132 mm., Bangkok, thirteen, 88 to 128 mm., Rayong, 79 specimens, 44 to 112 mm., Tachin, five, 29 to 148 mm., Paknam

Alepes mate (Cuvier)

Seven, 46 to 123 mm., Bangkok, three, 56 to 110 mm., Paknam, four, 44 to 108 mm., Rayong

Caranx sexfasciatus Quoy and Gaimard

One, 103 mm., Bangkok

Selaroides leptolepis (Cuvier)

Three, 68 to 127 mm., Paknam, five, 106 to 117 mm., Rayong

Carangoides praeustus (Bennett)

One, 160 mm., Paknam

Carangoides malabaricus (Schneider) Figure 222 (Rayong)

One, 86 to 145 mm., Paknam, 47 specimens, 40 to 123 mm., Rayong

Carangoides chrysophrys (Cuvier)

One, 100 mm., Paknam, seven 74 to 103 mm., Rayong

Atropus atropos (Bloch)

Seven, 57 to 135 mm., Paknam, two, 50 to 56 mm., Rayong

Scyris indica Ruppell Figure 223 (Rayong)

Nine, 47 to 117 mm., Rayong, five, 108 to 196 mm., Paknam

Trachinotus blochii (Lacépède) *

One, 81 mm., Rayong

Parastromateus niger (Bloch)

Two, 110 to 112 mm., Tachin

RACHYCENTRIDAE

Rachycentron canadum (Linnaeus)

One, 203 mm., Paknam

LACTARIIDAE

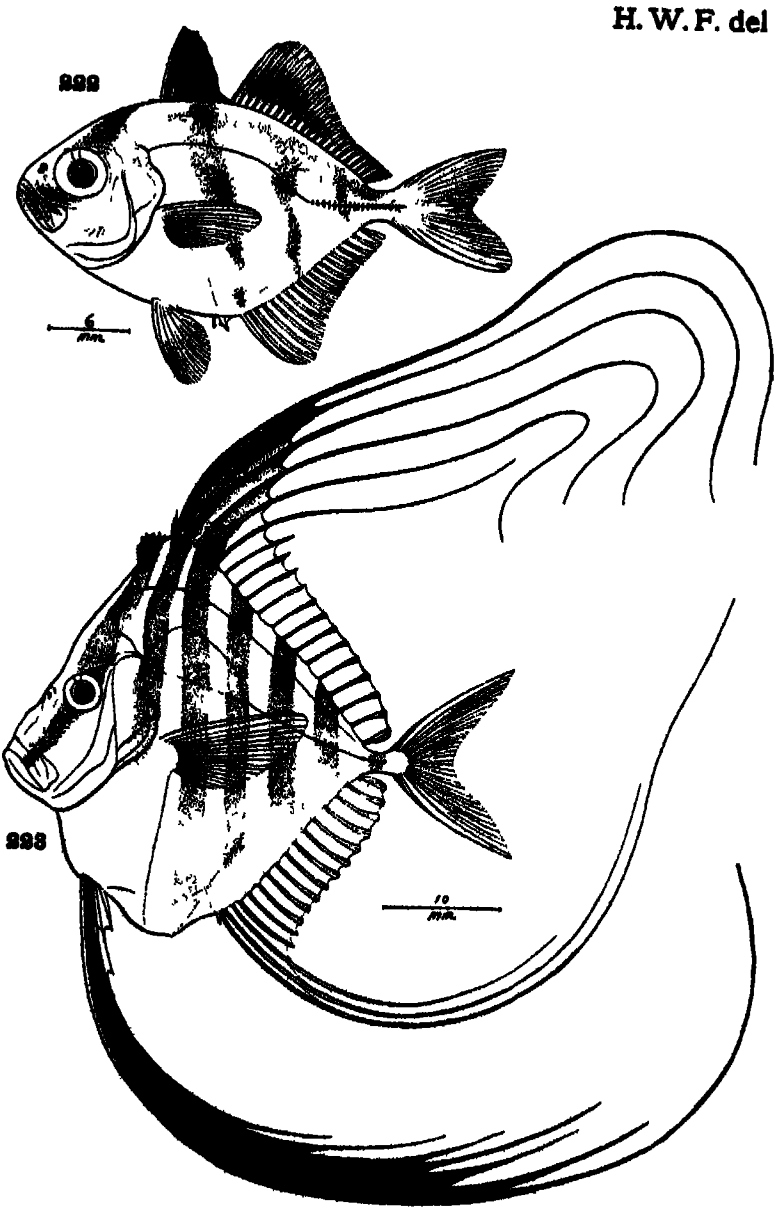
Lactarius lactarius (Schneider) Figure 224 (Rayong)

Three, 30 to 88 mm., Rayong; three, 70 to 110 mm., Tachin

LEIOGNATHIDAE

Macilentichthys berbis (Valenciennes)

Two, 58 to 68 mm., Paknam.



222. *Carangoides malabaricus* 223 *Scyris indica*

Macilentichthys leuciscus (Gunther).

One, 118 mm., Rayong, one, 120 mm., Paknam.

Leiognathus blochii (Valenciennes) *

Two, 84 to 90 mm , Tachin; four, 116 to 123 mm , Paknam; six, 28 to 68 mm , Bangkok

Leiognathus equila (Forskål)

Two, 48 to 60 mm , Tachin, nine, 23 to 53 mm , Rayong

Leiognathus splendens (Cuvier)

Eighteen, 41 to 75 mm , Paknam

Leiognathus daura (Cuvier) Figure 225 (Bangkok)

Depth 2 to 2$\frac{3}{8}$, head 3 to 3$\frac{3}{8}$, width 1$\frac{7}{8}$ to 2 Snout 3 to 3$\frac{1}{4}$ in head, eye 2$\frac{4}{5}$ to 3$\frac{1}{8}$, greater than snout in young to subequal with age, 1 to 1$\frac{3}{8}$ in interorbital, maxillary reaches $\frac{1}{4}$ in eye in young, to front eye edge with age, interorbital 2$\frac{1}{2}$ to 2$\frac{4}{5}$ in head, low, broadly convex Inner edge of gill opening with 2 wide set bony knobs Gill rakers 7 + 14, lanceolate, 1$\frac{3}{4}$ in gill filaments, which 2$\frac{3}{8}$ in eye No serrae or spines on ridges above eye or on sides of head

Scales largely uniformly small on body Chest and breast, up half way to pectoral and back to anal in narrow strip naked. Ventral with pointed scale in axil $\frac{2}{5}$ length of fin Spinous dorsal and spinous anal each with basal scaly sheath, less developed in young Lateral line of 56 or 57 rather large pores, continuous to caudal base

D VIII, 15, i or 16, i, second spine 1$\frac{3}{8}$ to 1$\frac{3}{5}$ in head, soft fin height 3$\frac{1}{4}$ to 4$\frac{1}{2}$, A III, 15, i, or 16, i, second spine 1$\frac{4}{5}$ to 2$\frac{1}{8}$, soft fin height 3$\frac{7}{8}$ to 4; caudal 1 to 1$\frac{1}{3}$, deeply emarginate, least depth of caudal peduncle 4$\frac{1}{4}$ to 4$\frac{1}{2}$, pectoral 1$\frac{1}{4}$ to 1$\frac{1}{3}$, rays ii, 18, ventral rays I, 5, fin 2 to 3 in head Vent little before tips of depressed ventral spines

Back gray, sides and below largely silvery white Back with scattered and rather large blotches of darker gray in young, become broken as more or less vertical, variable lines on back with age Iris white. End of snout gray brown, lips white Fins pale, spinous dorsal with large black apical blotch

Two, 33 to 79 mm , Bangkok, eight, 70 to 123 mm , Rayong

Leiognathus bindus (Valenciennes).

Two, 43 to 60 mm , Bangkok, series of 184 specimens, 29 to 88 mm., Paknam

Leiognathus fasciatus (Lacépède) Figure 226 (Rayong)

One, 97 mm , Rayong; one, 120 mm , Paknam

Secutor insidiator (Bloch)

Two, 69 to 78 mm , Bangkok; three, 54 to 70 mm , Tachin; thirteen, 50 to 80 mm , Paknam

Secutor ruconius (Buchanan-Hamilton) *

Two, 44 to 60 mm , Tachin; 21 specimens, 40 to 95 mm., Paknam.

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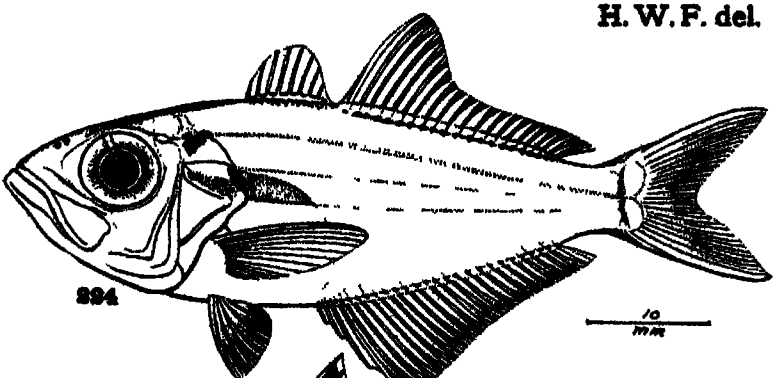

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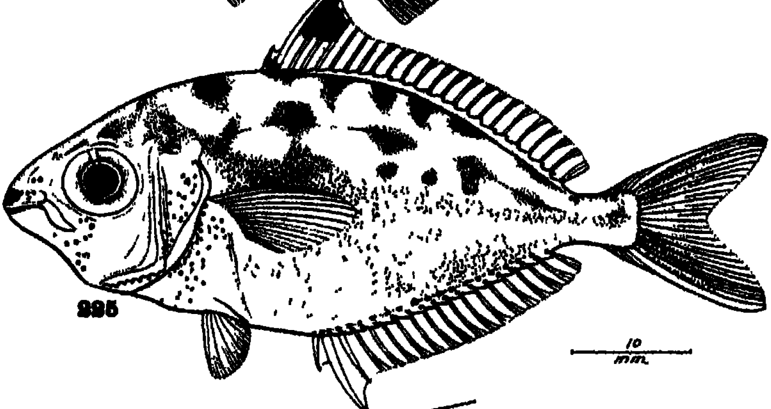

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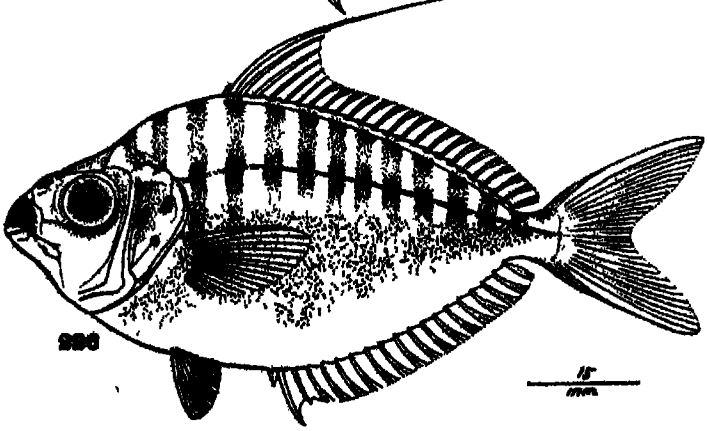


226

224. *Lactarius lactarius* 225 *Leiognathus daura.*
226 *Leiognathus fasciatus.*

Gazza equulaeformis Ruppell

One, 125 mm , Paknam, ten, 40 to 72 mm , Rayong Depth 2⅘

Gazza minuta (Bloch) *

Eight, 95 to 126 mm , Rayong Depth 2 to 2⅕

CHANDIDAE

Acanthoperca wolffi (Bleeker) Figure 227 (Bangkok)

Five, 61 to 118 mm , Bangkok, one, 112 mm , Paknam, two, 57 to 60 mm , Tachin

Chanda siamensis, new species Figure 228 (Bangkok)

Depth 2, head 2⅗ to 2¾, width 2⅕ to 2¼ Snout 4¼ to 4½ in head from snout tip, eye 2⅗ to 3, greater than snout or interorbital, maxillary reaches ⅕ to ⅓ in eye, expansion 1⅘ to 3, length 2⅗ to 2¾ in head from snout tip, interorbital 3⅗ to 4¼, rather low, convex, hind preopercle edge denticulate, and ridge with lower edge denticulate, though vertical edge entire, lower preorbital edge serrate, small spine before and opposite middle in front of eye Gill opening large, extends forward opposite front eye edge Gill rakers 4 + 15, lanceolate, equal gill-filaments, which 2 in eye

Scales 46 or 47 + 5 or 6 in lateral line, 11 above, 23 or 24 below to anal origin Cheek with 4 or 5 rows of scales, head otherwise largely naked, also predorsal region Dorsals and anals with rather broad basal scaly sheaths, caudal also well scaled basally Ventral with pointed axillary scale 2⅘ in fin Lateral line well arched anteriorly, median along side of tail, tubes simple, all well exposed

D VIII, 13, I to 15, I, second spine 1¼ to 1⅗ in total head length, first branched ray 1½ to 1⅘, A III, 14, I, third spine 1¼ to 1⅘, first branched ray 1⅓ to 1⅗, caudal 2⅙ to 2⅗ in rest of fish, deeply forked, least depth of caudal peduncle 2¾ to 2⅘ in total head length, pectoral 1½ to 1⅗, rays I, 13, ventral rays I, 5, fin 1½ to 1⅗ Vent at first ⅗ in depressed ventrals

Body pale to uniform light brown, with silvery reflections on head and sides Iris gray End of muzzle, predorsal, and back along base of dorsal sheaths with scattered dark brown dots Fins whitish to transparent, with scattered dark to dusky dots terminally or marginally on vertical fins

A N S.P., No 68,233 Bangkok, Siam Length 60 mm Type Also Nos 68,234 to 68,243, same data, paratypes Length 40 to 52 mm. Besides the above a series of 214 specimens 25 to 58 mm , Bangkok, 92 specimens, 29 to 59 mm , Kemrat This material not considered paratypic

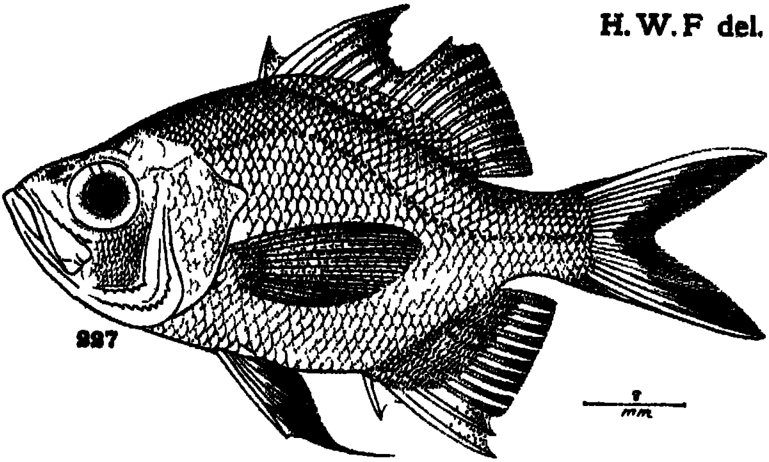
C siamensis differs from the Indian species described by Day, in its larger scales. *C ranga* Hamilton-Buchanan usually differs in the penultimate dorsal spine shorter than the spine immediately before it Day gives the scales as 60 to 70 in the lateral line, besides no scales are shown on his figure of *C ranga*

(Named for Siam)

Ambassis urotaenia Bleeker *

Two, 80 to 90 mm., Rayong

H. W. F del.



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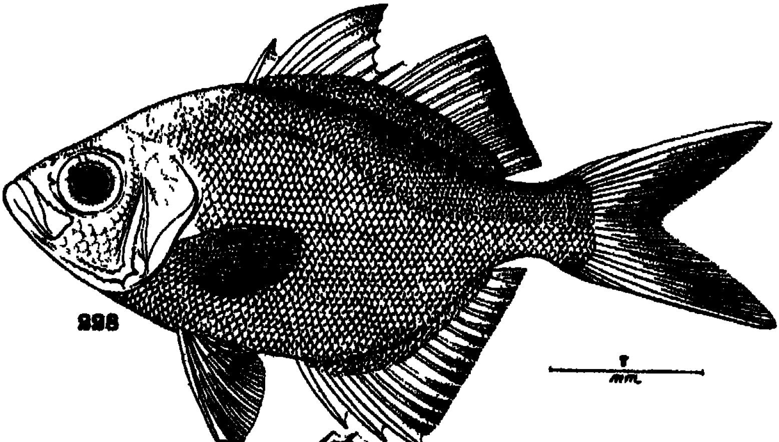

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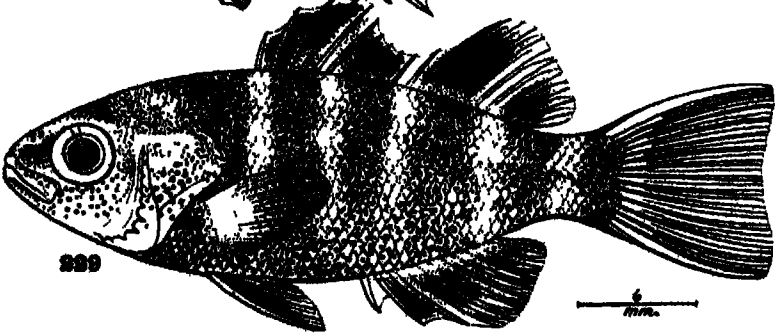


229

227 *Acanthoperca wolffi* 228 *Chanda siamensis*
229 *Serranus fario*

Ambassis safgha (Forskål) *

Six, 63 to 68 mm., Rayong

Ambassis buruensis Bleeker *

Series of 318 specimens, 43 to 52 mm., Rayong

Ambassis gymnocephalus (Lacépède)

Six, 42 to 66 mm., Bangkok, two, 59 to 65 mm., Paknam, six, 43 to 70 mm., Tachin

Ambassis kopsii Bleeker

Seventeen, 28 to 80 mm., Rayong

AMIIDAE

Amia multitaeniata (Cuvier).*

Depth 2¾; head 2⅝, width 1⅝ Snout 3½ in head from snout tip, eye 3¾, 1$\frac{1}{10}$ in snout, slightly greater than interorbital, maxillary reaches ½ in eye, expansion 1¾ in eye, length 1$\frac{9}{10}$ in head from snout tip, teeth finely villiform in jaws, on vomer and palatines, interorbital 4⅛ in head from snout tip, hind preopercle edge very feebly serrate Gill rakers 5 + 14, of which 3 above and 6 below rudimentary knobs, gill filaments ⅞ of gill rakers, which 2 in eye.

Scales 33 + 6 in lateral line; 5 above, 10 below, 8 predorsal, 3 rows on cheek to preopercle edge Ventral axil with short scale, ⅓ of fin Caudal base scaly Several rather large scales on opercle Lateral line very distinct, mostly concurrent with profile of back, falls median along side of tail Scales with 14 basal radiating striae, 114 apical denticles, each with a transverse series of basal elements, circuli fine, basal, obsolete apically

D VI, I, 9, i, second spine 2¼ in total head length, first branched ray 1¾, A. II, 8, i, second spine 2¾, second ray 1⅞, caudal 1¼, little emarginate behind, with 2 distinct rounded lobes, least depth of caudal peduncle 2⅜; pectoral 1⅜, rays ii, 13, ventral rays I, 5, fin 1½ in total head length. Vent slightly before tips of depressed ventrals

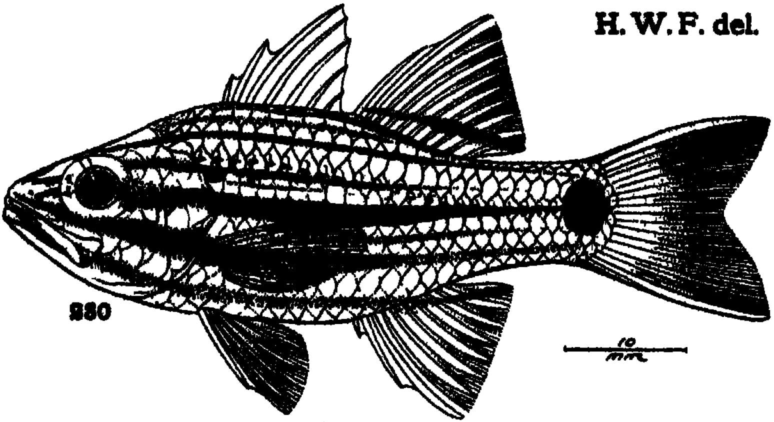
Brown, under surfaces a little paler. At junctures of scale rows dark brown band, forming 4 above lateral line parallel with its course and 10 below, all horizontal Iris gray Spinous dorsal largely blackish brown, basally behind and last membrane pale to whitish. Fins otherwise dull brown, with base of soft dorsal narrowly blackish brown.

One, 142 mm., Bangkok

Amia robusta Smith and Radcliffe Figure 230 (Paknam)

Depth 2⅔ to 2⅚; head 2½ to 2⅗, width 2. Snout 3⅗ to 4 in head, eye 2⅘ to 3, greatly exceeds snout or interorbital; maxillary reaches ⅗ in eye, expansion 2, length 2 in head; teeth minutely villiform in jaws, on vomer and palatines, interorbital 4 to 4⅕, low, nearly level, hind preopercle edge very minutely and feebly denticulated. Gill rakers 5 + 13, of which 3 above and 5 below rudimentary low knobs; gill filaments ⅘ of gill rakers, which 2½ in eye

H. W. F. del.



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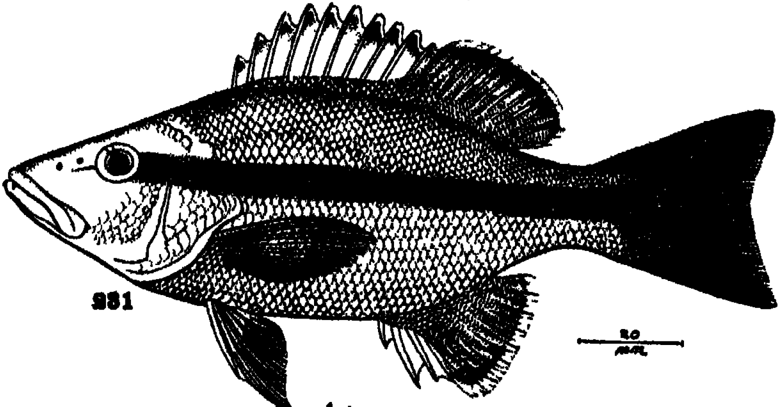

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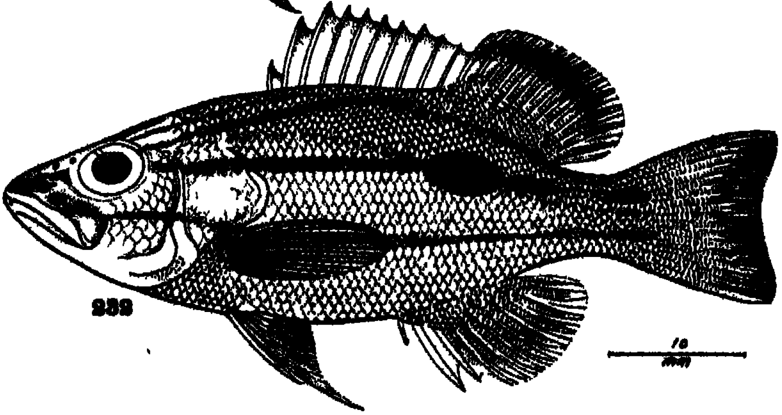


232

230 *Amia robusta* 231 *Lutjanus flavipes.*
232 *Lutjanus fulviflamma.*

Scales 22 or 23 + 4 in lateral line, 2 above, 6 below, 3 or 4 predorsal of which anterior very large and with large longitudinal flutings Caudal base scaly Large scales on chest and breast Lateral line little curved, prominent, tubes large, each with accessory like scale above and below Scales with 15 to 21 basal radiating striae, 90 to 121 fine apical denticles, with 2 or 3 transverse basal elements, circuli fine, basal, obsolete apically

D VII – I, 9, i, third spine 1½ to 1¾ in head, first branched ray 1¼, A II, 8, i, second spine 2½ to 2⅘, first branched ray 1½, caudal 1 to 1⅓, emarginate behind, lobes broadly triangular, least depth of caudal peduncle 2¼ to 2⅗, pectoral 1⅓ to 1⅝, rays i, 12, ventral rays I, 5, fin 1½ to 1⅗ Vent close before tips of depressed ventrals

Light brown, paler to whitish on under surfaces Dark band begins over nostrils extends over side of head and back to upper part of caudal base Still higher and narrower one begins as median line on occiput, divides before dorsal to extend around each side of bases of dorsal fins Third line extends back from upper hind edge of eye, crossing lateral line below soft dorsal Fourth or axial dark band reaches lateral line behind dorsal, narrowing behind, and ending in round black blotch little less than eye, very contrasted, at caudal base Fifth dark band from preorbital along lower eye edge to pectoral base along lower side of caudal peduncle. Above and parallel a less distinct and shorter dark streak Sixth dark band extends from maxillary below pectoral back to middle of anal base Iris dark gray Fins all pale brownish, dorsals and caudal little more brownish Dark subbasal horizontal band on soft dorsal, ends at end of last ray Similar dark band on anal subbasally

One, 82 mm , Paknam, one, 66 mm , Bangkok A quite variable species, and though Fowler and Bean 1930 identify it with *Amia fasciata* (Shaw), the larger black blotch on the caudal base is quite distinctive The present materials also show other details of coloration

SERRANIDAE

Cephalopholis pachycentron (Valenciennes)

One, 198 mm , Bangkok, six, 72 to 139 mm., Rayong

Serranus diacanthus Valenciennes

One, 130 mm , Rayong, four, 166 to 178 mm , Paknam

Serranus fario (Thunberg) Figure 229.

Three, 18 to 150 mm , Bangkok Compared with *Epinephelus maculatus* as figured by Bleeker, but less distinctly cross-barred

PEMPHERIDAE

Pempheris oualensis Cuvier *

Fifteen, 117 to 135 mm , Rayong.

PRIACANTHIDAE

Priacanthus tayenus Richardson

One, 268 mm , Bangkok

LUTJANIDAE

Lutjanus flavipes (Valenciennes) * Figure 231

One, 148 mm , Bangkok

Lutjanus fulviflamma (Forskål) Figure 232 (Rayong)

One, 127 mm , Bangkok, one, 58 mm , Rayong

Lutjanus vitta (Quoy and Gaimard)

One, 134 mm , Bangkok, seven, 129 to 255 mm , Rayong

Lutjanus erythropterus Bloch

Two, 160 to 172 mm , Rayong

POMADASYIDAE

Caesio cuning (Bloch)

One, 204 mm , Rayong

Plectorhinchus niger (Cuvier)

One, 80 mm , Bangkok, three, 40 to 50 mm , Rayong

Plectorhinchus pictus (Thunberg)

One, 123 mm , Paknam, one, 169 mm , Rayong

Pomadasys grunniens (Schneider)

One, 132 mm , Paknam

Pomadasys maculatus (Bloch)

Two, 133 to 166 mm , Paknam, 36 specimens, 35 to 69 mm , Rayong

Pomadasys hasta (Bloch) Figure 233

Four, 35 to 84 mm , Rayong

Pomadasys trifasciatus, new species Figure 234

Depth $2\frac{1}{2}$ to $2\frac{3}{4}$, head $2\frac{1}{2}$ to $2\frac{3}{4}$, width $2\frac{1}{6}$ to $2\frac{1}{2}$ Snout $3\frac{3}{4}$ to 4 in head from snout tip, eye $2\frac{3}{4}$ to 3, greatly exceeds snout or interorbital, maxillary largely concealed, reaches opposite front of eye, length $2\frac{1}{3}$ to $2\frac{1}{4}$ in head from snout tip, mandible well protruded in front, teeth very minute, in narrow bands in jaws, interorbital $4\frac{1}{3}$ to $4\frac{3}{4}$ in head from snout tip, with median convexity, and deep channel or groove over each eye parallel with same, preopercle edge serrate all around and serrae little larger around angle. Gill rakers 7 + 14, lanceolate, slender, subequal with gill filaments or 2 in eye

Scales 42 or 43 + 3 or 4 in lateral line, 6 above to spinous dorsal origin, 13 below to spinous anal origin, 15 predorsal forward opposite hind eye edge. Head above and on sides very cavernous, with loose deciduous scales Base of ventral with axillary scale $\frac{1}{3}$ of fin Bases of vertical fins finely scaled Lateral line little arched, concurrent with dorsal profile, becomes median along side of caudal peduncle, tubes simple, well exposed. Scales with 8 to 10 basal radiating striae; circuli fine basally, coarse though complete apically

D XII, 13, I, fourth spine 1¾ to 2 in total head length, first branched ray 1⅞ to 2¼; A. III, 7, I, second spine 2 to 2⅛, second branched ray 2 to 2⅛, caudal 1⅜ to 1⅓, truncate, with edges rounded, least depth of caudal peduncle 3¾ to 4, pectoral 1¼ to 1⅓, rays II, 12, ventral I, 5, fin 1½ to 1⅝ Vent little before ends of depressed ventrals

Pale brown on back, sides and below whitish. Dark brown band includes region along dorsal bases and upper edge of caudal peduncle Second broader dark brown longitudinal band from occiput to caudal base, with ill defined dark blotch above and below on last. Third short parallel dark brown band from behind opercle and narrowing backward ends opposite spinous dorsal Snout brown above Iris gray, evidently white in life. Blackish blotch about large as pupil on hind part of opercle Vertical fins brownish, dark gray brown on membranes of spinous dorsal, soft dorsal dark gray on outer half and subbasal dark gray longitudinal band, anal dark gray on outer portion and each ray similar basally Paired fins pale to whitish

A N S P, No 68,244 Paknam, Siam Length 52 mm Type Also Nos 68,245 and 68,246, same data, paratypes Length 51 mm

Though based on small specimens this species appears to be quite distinctive in the 3 broad, dark longitudinal bands and their arrangement It appears related to the South African *P striatus* (Gilchrist and Thompson), though with more gill rakers and fewer scales in the lateral line

(*Tres* three + *fascia* band)

Scolopsis vosmeri (Bloch)

One, 140 mm., Bangkok

Scolopsis temporalis (Cuvier) Figure 235

Four, 158 to 200 mm , Rayong Though the dark axial streak is not very distinct on the postocular region and the front of the costal region it is pronounced and broad as the pupil at least over the middle of the pectoral, and fades out behind as it crosses the lateral line on the side of the caudal peduncle In most other respects it is greatly like my figure of the Sriracha specimen I identified as *S monogramma* It also has a dark, though inconspicuous streak across the pectoral base

TERAPONIDAE

Datnioides polota (Buchanan-Hamilton)

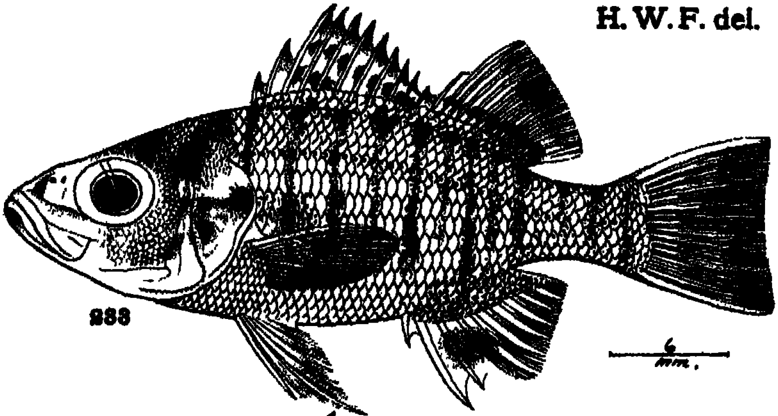
Six, 82 to 98 mm., Bangkok

Terapon jarbua (Forskål).

Seven, 54 to 156 mm , Bangkok; eleven, 61 to 103 mm., Tachin; 22 specimens, 60 to 115 mm , Rayong

Terapon theraps (Cuvier).

Four, 80 to 131 mm., Paknam; five, 30 to 49 mm., Rayong; eight, 97 to 148 mm , Tachin. Of the last only one specimen varies in the second black bar of the upper caudal lobe, broken as 3 subequal black spots



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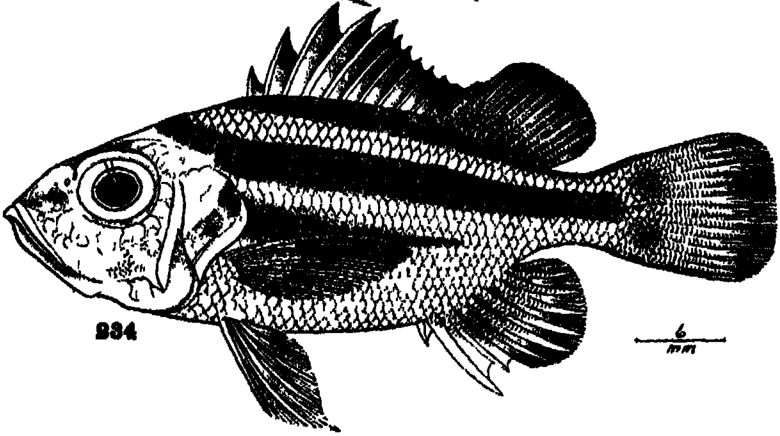

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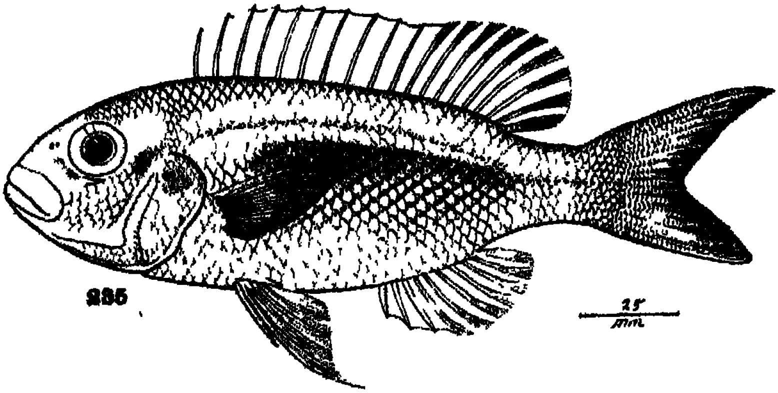


235

233 *Pomadasys hasta.* 234 *Pomadasys trifasciatus*
235 *Scolopsis temporalis*

Pelates quadrimaculatus (Bloch) *

One, 126 mm., Rayong

LETHRINIDAE

Lethrinus frenatus Valenciennes

One, 109 mm , Bangkok, one, 133 mm , Rayong

SPARIDAE

Pentapodus setosus (Valenciennes)

One, 152 mm to end of lower caudal lobe (upper filament 28 mm longer from end of upper caudal lobe), Rayong

Nemipterus luteus (Schneider) Figure 236

Three, 149 to 173 mm , Rayong

MULLIDAE

Upeneus sulphureus Cuvier

One, 126 mm , Bangkok, three, 53 to 167 mm , Rayong; two, 97 to 139 mm , Paknam.

Upeneus tragula Richardson.

One, 170 mm , Bangkok, one, 94 mm., Paknam, one, 164 mm , Rayong.

Mulloidichthys auriflamma (Forskål) *

One, 180 mm , Rayong The golden lateral band is now gray, paler on side of caudal peduncle It is evidently intensified from preservation in formaline

GERRIDAE

Gerres setifer (Buchanan-Hamilton) *

One, 43 mm , Rayong

Gerres abbreviatus Bleeker

Five, 29 to 52 mm., Rayong

Gerres oblongus Cuvier

One, 45 mm , Rayong

Gerres kappas Bleeker * Figure 247

Nineteen, 23 to 105 mm , Rayong

Gerres filamentosus Cuvier

Four, 115 to 121 mm , Paknam

SILLAGINIDAE

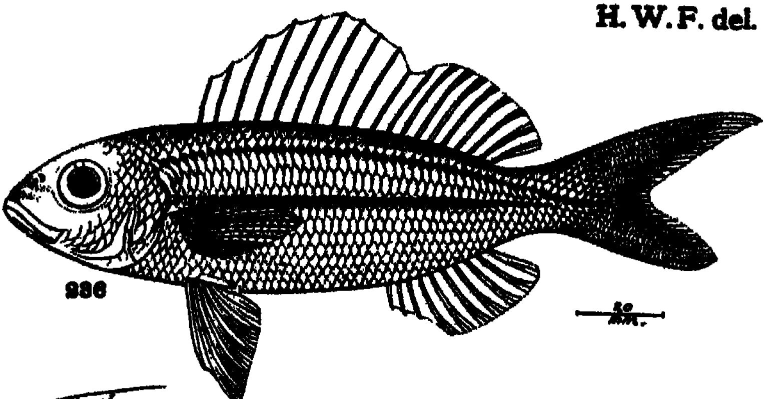
Sillago sihama (Forskål)

Thirty-three, 60 to 149 mm , Rayong

Sillago maculata Quoy and Gaimard.

One, 178 mm , Rayong

H. W. F. del.



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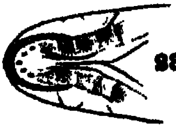

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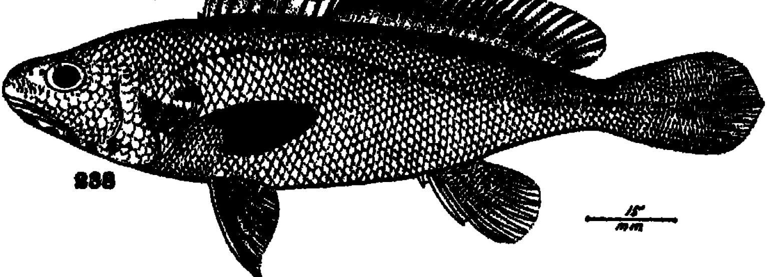

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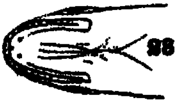

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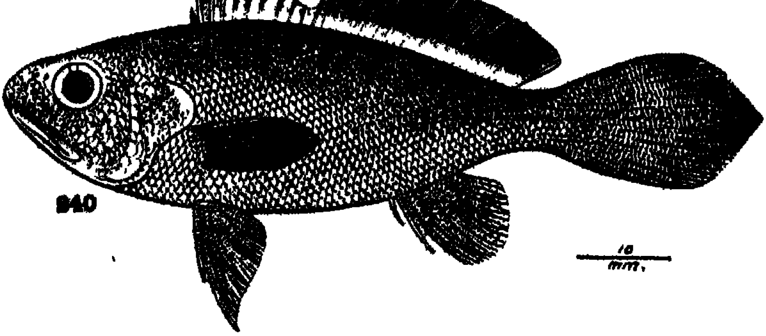


240

236 *Nemipterus luteus* 237, 238. *Johnius osseus*
239, 240 *Johnius sina*

SCIAENIDAE

Otolithes argenteus Cuvier

Two, 147 to 158 mm , Tachin

Otolithes ruber (Schneider)

One, 81 mm , Paknam

Johnius diacanthus (Lacépède) *

Five, 33 to 61 mm , Paknam

Johnius aneus Bloch

Nine, 47 to 83 mm , Tachin, 33 specimens, 60 to 90 mm , Rayong D X, I, 23, I, A II, 7, I Lower gill rakers 14

Johnius osseus (Day) Figures 237 (head below), 238

Four, 100 to 126 mm , Tachin Depth 3¾ to 3⅞ Pores 43 to 46 in lateral line to caudal base Lower gill rakers 10 D X, 23, I or 24, I, A II, 6, I, second anal spine 2¼ to 2⅝ in postocular or 2½ to 3 in head These specimens seem to agree with Day's account They differ only in that the second anal spine is longer and the pectoral dark or dusky

Johnius sina (Cuvier) * Figures 239 (head below), 240

One, 86 mm., Bangkok, 22 specimens, 62 to 82 mm , Rayong Depth 3⅛ to 3¼ Several external canines along outer front edge of upper jaw when closed Mandible included in upper jaw Lower gill rakers 10, lanceolate Pores 38 to 40 in lateral line to caudal base D X, I, 27, I to 29, I, A II, 7, I Pectoral 1⅓ to 1½ in head Spinous dorsal gray black marginally

Johnius soldado (Lacépède) Figures 241 (head below), 242

One, 63 mm , Paknam Lower gill rakers 13

Johnius dussumieri (Cuvier)

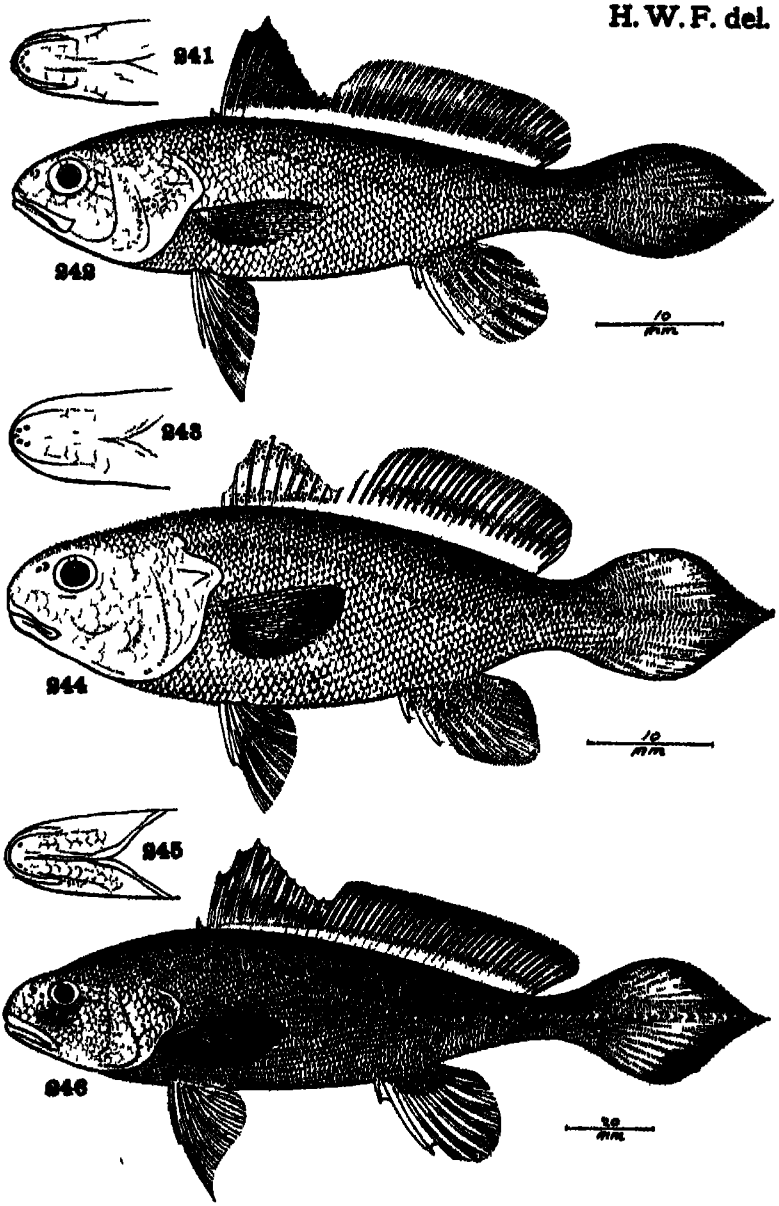
Fifteen, 95 to 157 mm , Tachin, one, 108 mm , Bangkok Depth 3⅜ to 4 Lower gill rakers 9 to 11 Tubes 40 to 48 in lateral line to caudal base D X, I, 26, I to 30, I, A II, 7, I, second spine 2¼ to 2⅜ in head The figure given by Valenciennes shows jaws about equal, depth 3⅓, third anal spine 4 in head

Johnius trachycephalus (Bleeker) *

Depth 3¾ to 3⅘, head 3 to 3⅛, width 2 Snout 3⅓ to 3¾ in head, with upper conic protuberance in front, eye 4½ to 4¾, 1⅛ to 1¼ in snout, 1½ to 1¾ in interorbital, maxillary reaches ½ in eye, length from snout tip 2 to 2⅛ in head, teeth in villiform bands in jaws, upper outer little enlarged and exposed when jaws close, interorbital 3⅛ to 3½, low, broadly and unevenly convex; hind preopercle edge denticulate, several denticles little enlarged at angle Gill rakers 7 + 15, lanceolate, 1½ in fill filaments, which 1¾ in eye.

Scales 44 to 48 in lateral line to caudal base; 10 above to spinous dorsal origin, 10 or 11 above spinous anal origin to lateral line Soft dorsal, anal

H. W. F. del.



241, 242 *Johnius soldado* **243, 244.** *Johnius melanobrachium.*
245, 246 *Johnius microlepis*

and caudal with fine scales basally. Head very cavernous and with rather loosely attached scales Body scales small and crowded anteriorly, larger on tail Lateral line arched little at first, becomes median on tail above anal, tubes large, simple, well exposed Scales with 7 or 8 basal radiating striae, close set, evenly spaced, circuli fine, a little coarser apically.

D IX, I, 23, i to 27, i, third spine 1⅞ to 2⅛ in head, first branched ray 3¾ to 4; A. II, 6, i or 7, i, second spine 2$\frac{1}{11}$ to 2½, second branched ray 2⅝ to 2⅓, caudal 1¼ to 1⅗, ends in median point behind, least depth of caudal peduncle 4 to 4⅔, pectoral 1⅜ to 1⅘, rays i, 17, ventral rays I, 5, fin 1¼ to 1⅞ Vent close before anal origin

Head brownish, body drab, pale to whitish below Whole upper surfaces dusted with minute blackish dots Iris gray Jaws and lips pale or whitish Spinous dorsal gray, membranes dusted with blackish terminally and basally Soft dorsal whitish basally, dusted with gray black broadly over outer surface Caudal pale, grayish terminally Anal whitish, with gray black dots on outer portion Pectoral with upper half blackish brown, lower half whitish Ventral whitish

Six, 84 to 100 mm , Tachin

Johnius melanobrachium Fowler Figures 243 (head below), 244

Six, 62 to 113 mm , Tachin

Johnius microlepis (Bleeker) Figures 245 (head below), 246

One, 164 mm , Bangkok, one, 174 mm , Tachin Depth 3¼ to 4⅗ Eye 5⅛ to 6¾ in head Scales 90 counted along and above lateral line to caudal base D X, I, 33, i or 34, i, A III, 7, i Anal scaly Paired fins small, pale

Sciaena indica Kuhl and Van Hasselt

Three, 50 to 67 mm , Paknam

Sciaena dussumieri (Valenciennes)

Three, 61 to 70 mm., Rayong, eight, 42 to 55 mm , Tachin.

NANDIDAE

Pristolepis fasciatus (Bleeker)

Six, 62 to 78 mm , Bangkok, 24 specimens, 37 to 72 mm., Tachin

SCORPAENIDAE

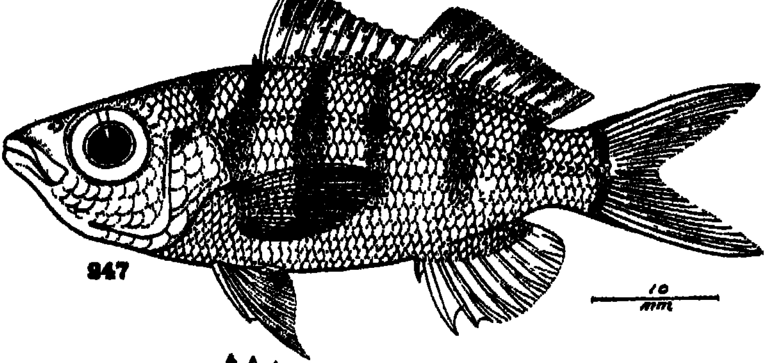
Prosopodasys gogarzae Jordan and Seale*

One, 59 mm , Port Nakara, Gulf of Siam, Oct 20, 1923, Dr H M. Smith. It agrees in most every detail with the original figure and description of this Philippine species

Pterois volitans (Linnaeus)

Three, 158 to 222 mm , Rayong

H. W. F. del.



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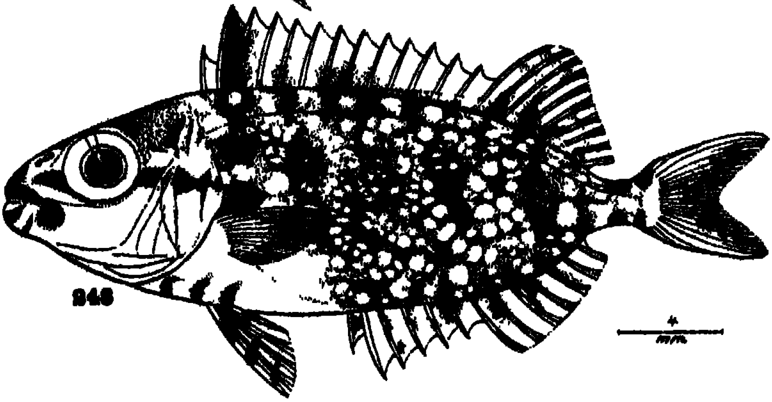

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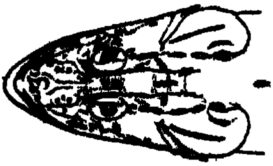

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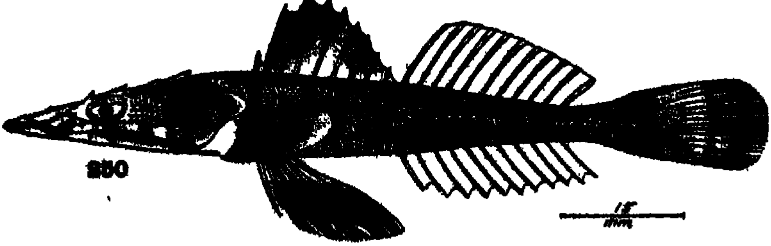


250

247 *Gerres kappae.* 248. *Siganus rivulatus.*
249, 250. *Suggrundus hunti.*

SYNANCEJIDAE

Synancidium horridum (Linnaeus) *

One, 207 mm , Rayong

PLATYCEPHALIDAE

Platycephalus indicus (Linnaeus)

Two, 218 to 268 mm , Paknam

Grammoplites scaber (Linnaeus)

Five, 62 to 105 mm , Bangkok, one, 154 mm., Tachin; one, 185 mm., Paknam

Suggrundus hunti, new species Figures 249 (head above), 250

Depth 7⅙, head 2⅗, width 1⅔ Snout 3⅛ in head from snout tip, eye 7, 1⅞ in snout, greatly exceeds bony interorbital, maxillary reaches ⅓ in eye, its hind end concave, length $2\frac{9}{10}$ in head from snout tip, teeth villiform, very fine, in bands in jaws, on vomer and palatines, tongue broadly spatulate, truncate in front, interorbital about half eye diameter, deeply concave Gill rakers 2 + 4, lanceolate, subequal with gill filaments, ½ of eye

Pair of very small, close set internasal spines; supraorbital ridge with rather larger anterior spine and posteriorly 4 spines, then pair of long parallel keels to occiput with spine on each small space from end; short spineless low median interparietal keel, postocular spine high, followed closely by small spine, one over preopercle and 3 over opercle with last at suprascapula; opercle with 2 oblique keels, each ending in spine, ridge of suborbital stay with spine at preorbital, 2 low spines below eye, and ends in spine at preopercle half long as eye; with very small outer antero-basal spine, lower suborbital ridge forms keel and also ends in small spine at preopercle Distinct small humeral spine

Scales 55 + 5 in lateral line, 6 above, 14 below, 15 predorsal forward to occiput Head scaly on sides behind eye Caudal base scaly, also chest, breast and prepectoral region Lateral line complete, distinct, tubes large, simple, without spines Scales with 7 basal radiating striae; 12 or 13 apical denticles, with 2 or 3 transverse series of basal elements; circuli fine

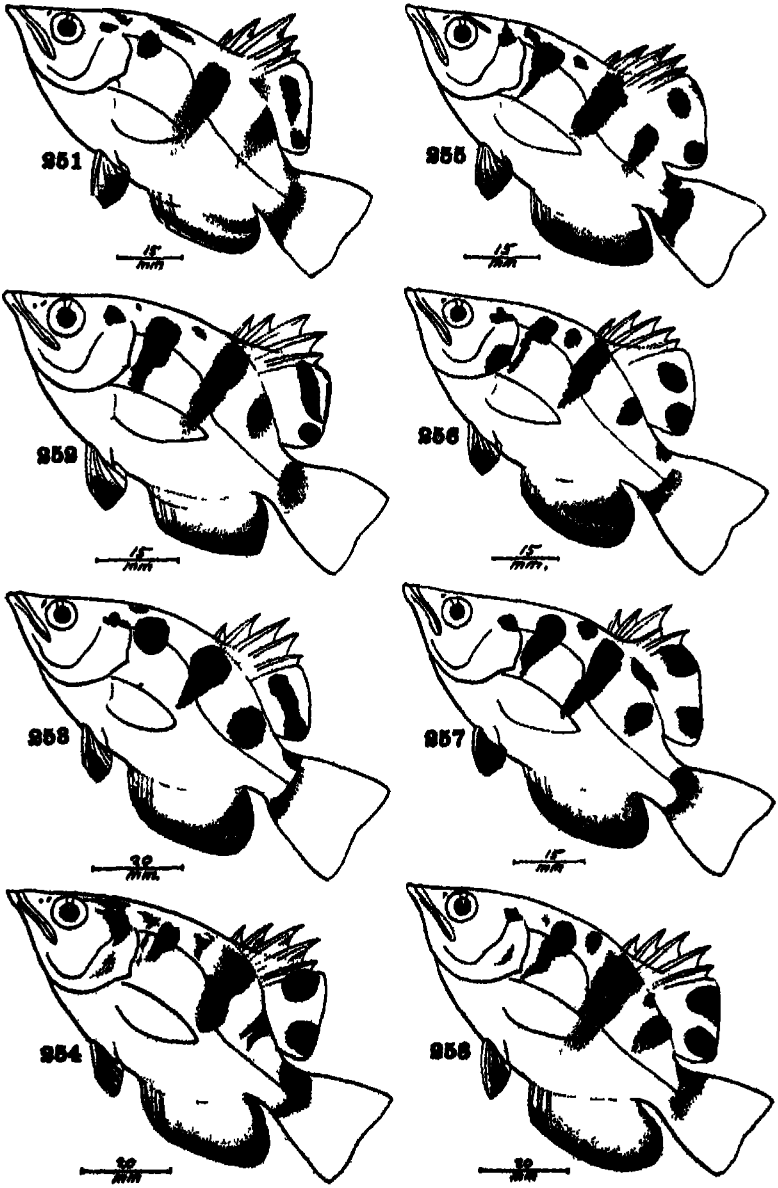
D IX, 11, third spine 2⅜ in total head length, second ray 3; A I, 10, first ray 4, caudal 1⅘, convex behind, pectoral 2½, rays 20, ventral rays I, 5, fin 1½. Vent close before anal.

Back and upper surfaces brown or drab, with 6 or 7 obscure darker transverse blotches Sides of head below with 6 indistinct dark blotches. Iris gray. Under surfaces, except paired fins, whitish. Spinous dorsal blackish. Soft dorsal pale, on each ray 4 dark spots Caudal whitish, with broad black basal and subterminal bands, and 2 less distinct medially. Anal white. Pectoral with 5 dark brown transverse bars on its upper part, greater lower portion blackish brown with whitish border. Ventral largely blackish terminally, border and base pale.

A N S P , No 68,247. Rayong, Siam Length 94 mm Type.

Compared with the East Indian species grouped by Bleeker with 50 to 60 rows of scales, as *Platycephalus malayanus* Bleeker, *P pristiger* Cuvier,

H. W. F del.



251 to 258 *Toxotes chatareus* (variation)

and *P. celebicus* Bleeker, all differ in the more or less serrated supraorbital ridges, the last also with other ridges serrated *Suggrundus crocodilus* (Tilesius) has far more scales (90).

(For the late Chreswell J. Hunt, of Chicago, to whom the Academy is indebted for local fishes)

TOXOTIDAE

Toxotes chatareus (Buchanan-Hamilton) * Figures 251 to 258 (variation)

Nine, 64 to 111 mm , Bangkok Scales 33 or 34

EPHIPPIDAE

Drepane punctata (Linnaeus)

Seven, 27 to 55 mm., Tachin, 25 specimens, 43 to 92 mm , Paknam.

SCATOPHAGIDAE

Scatophagus argus (Linnaeus)

One, 83 mm , Bangkok, one, 12 mm , Rayong, five, 53 to 108 mm , Tachin, four, 18 to 74 mm., Paknam

PLATACIDAE

Platax orbicularis (Forskål)

One, 39 mm , Paknam

CHAETODONTIDAE

Chelmo rostratus (Linnaeus)

Two, 88 to 133 mm , Bangkok

Parachaetodon ocellatus (Cuvier) *

Six, 92 to 118 mm , Rayong

Chaetodon octofasciatus Bloch *

Two, 112 to 118 mm., Bangkok

SIGANIDAE

Siganus rivulatus (Forskål) * Figure 248

Six, 24 to 30 mm., Bangkok

Siganus oramin (Schneider)

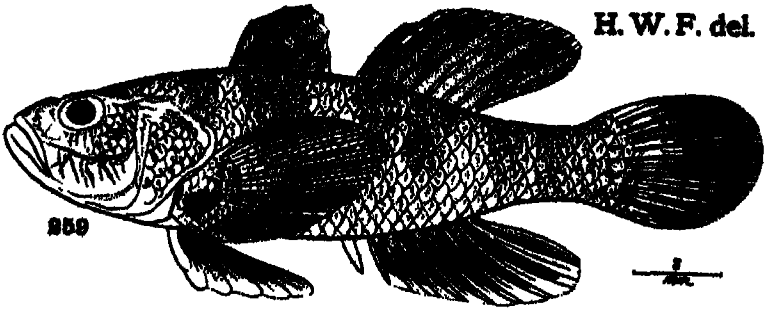
One, 164 mm., Rayong, six, 25 to 30 mm , Bangkok

POMACENTRIDAE

Abudefduf saxatilis (Linnaeus)

Two, 172 to 183 mm., Rayong; five, 17 to 34 mm., Bangkok Both large specimens have but 5 transverse dark bands, and not 6 as shown in Lacépède's figure of *Labrus saxatilis*, pl 19, fig. It shows a dark transverse postocular band, which was evidently included when counting the dark

H. W. F. del.



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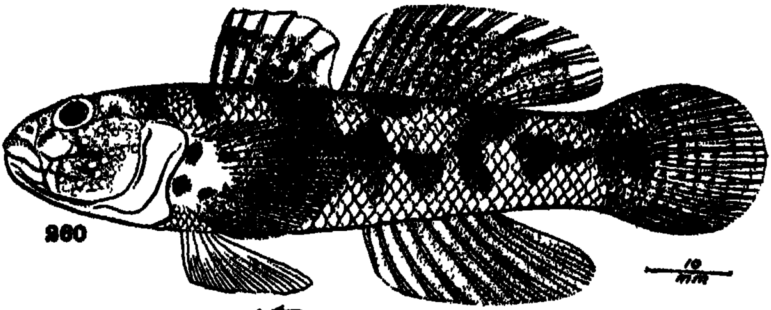

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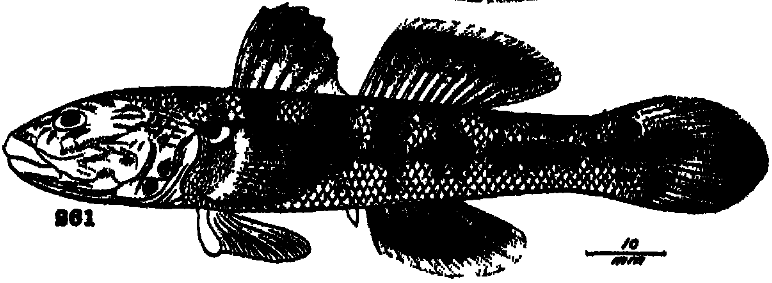

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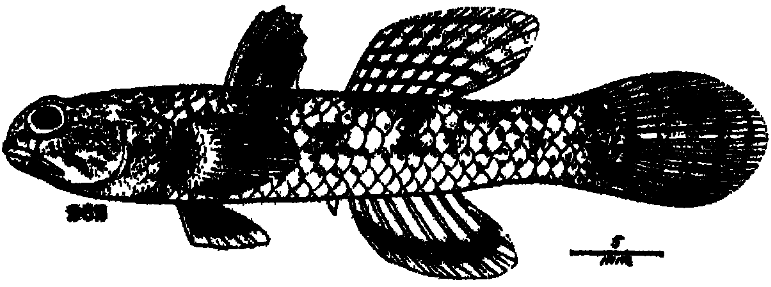


262

259 *Prionobutis koilomatodon* 260 *Bathygobius fuscus*
261. *Tukugobius ocellatus* 262. *Vaimosa chulae.*

bands It does not show a dark blotch at the pectoral origin, or a dark median band on each caudal lobe As the dark caudal bands are present in Cuvier's figure 135 of *Glyphisodon coelestinus*, that species had best be known as *Abudefduf coelestinus* (Cuvier), and later also figured by Jordan and Seale My young specimens with blackish ventrals

Abudefduf sordidus (Forskål) *

Two, 51 to 180 mm , Bangkok, one, 80 mm., Rayong

LABRIDAE

Thalassoma schwanefeldi (Bleeker)

Three, 61 to 104 mm , Bangkok The two larger specimens show two dark spots subbasally on third and fourth membranes of soft dorsal, while in the smallest specimen it is single, larger and more contrasted

Cheilinus chlorurus (Bloch)

One, 202 mm , Rayong

ELEOTRIDAE

Eleotris fusca (Schneider)

Three, 66 to 73 mm , Tachin

Butis butis (Buchanan-Hamilton)

Five, 58 to 102 mm , Bangkok, three, 41 to 98 mm , Tachin

Prionobutis koilomatodon (Bleeker) * Figure 259 (Tachin)

One, 51 mm , Paknam, five, 44 to 73 mm , Tachin.

Oxyeleotris marmorata (Bleeker)

Four, 135 to 154 mm , Bangkok

GOBIIDAE

Gobiella pellucida H M Smith

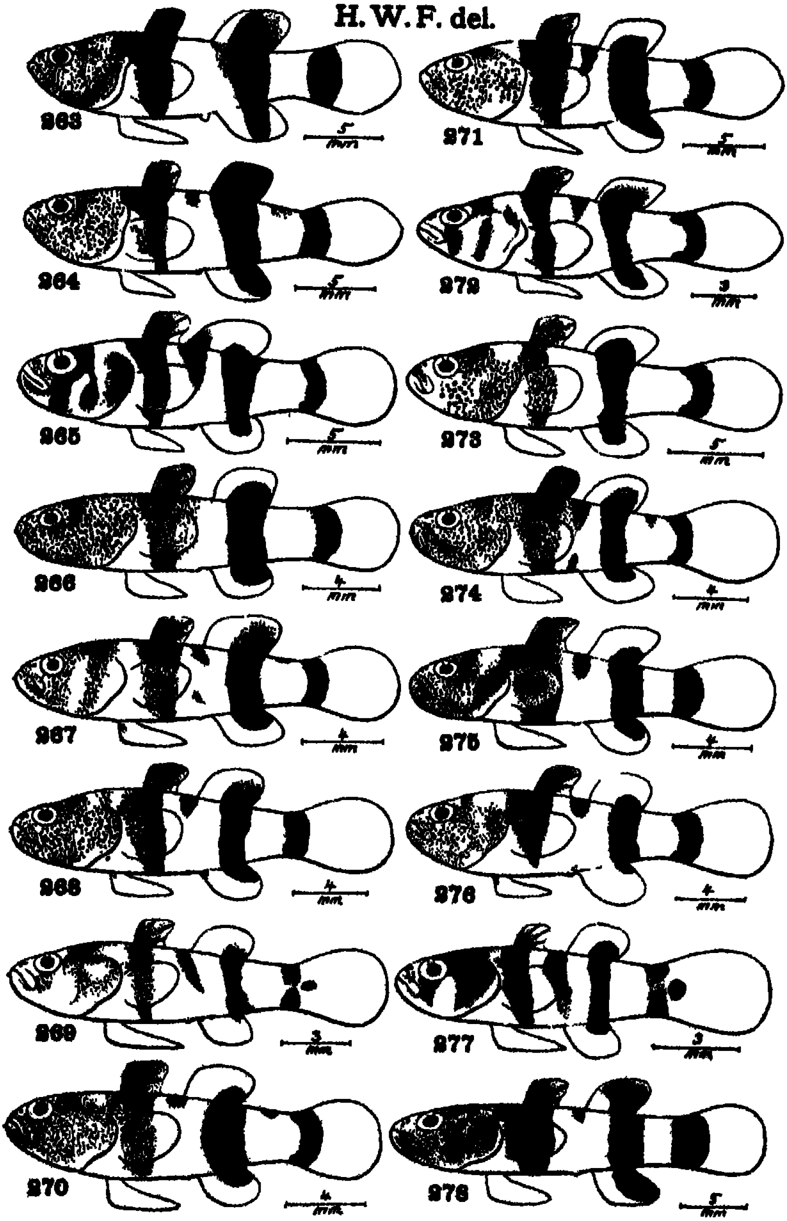
Seventy, 18 to 23 mm., Bangkok

Brachygobius xanthozona (Bleeker) Figures 263 to 277 (Bangkok), 278 (Medan).

Depth 3⅘ to 4⅔, head 2⅘ to 2¾, width 1½ to 1⅓. Snout 4¾ to 4⅘ in head from snout tip; eye 3½ to 4⅓, little greater to subequal with snout, little greater to subequal with interorbital, maxillary reaches to front eye edge to ⅓ in eye, length 3 to 3¼ in head from snout tip; teeth minute, in narrow band in each jaw, interorbital 3 to 3¾, level

Scales 26 in lateral series medially to caudal base; 9 or 10 between soft dorsal and anal origins Opercles scaly, cheek and predorsal naked. Row of fine papillae each side of snout, around suborbitals, along lower edges of mandible, along preopercle, 2 rows horizontally on cheek, and oblique row over opercle Scales with 12 or 13 basal radiating flutings; 11 or 12 apical denticles graduated shorter medially, circuli fine

D V – I, 8, third spine 2½ to 2¾ in total head length, soft dorsal height 2½ to 2⅘, A I, 8, fin height 2⅓ to 2½; caudal 1⅕ to 1¾, convex behind; least depth



263 to 278 *Brachygobius xanthozona* (variation)

of caudal peduncle 2 to 2⅓, pectoral 1⅗ to 1⅔, rays I, 14; ventral I, 5, fin 1¼ to 1⅗. Vent close before anal, with rather broad papilla.

Pale yellowish to whitish Head more or less dotted with dark gray to blackish Usually blackish transverse band on top of head behind eyes, sometimes extended down below eyes on cheek. Broad black transverse band connects spinous dorsal with belly at postventral region, sometimes crossing to meet its fellow Second broad black band connects last half of soft dorsal and anal Third broad black band at caudal base Variation may be seen by reference to the accompanying figures

Nineteen, 10 to 28 mm., Bangkok, one, 28 mm., Medan, Sumatra, March 1934. A beautiful littly goby with greatly contrasted color pattern

Thaigobiella H M Smith, with its genotype *T. sua* H M Smith, is a synonym of the present species The genotype of *Brachygobius* was long made known (1849) as *Gobius xanthozona* Bleeker, from Surabaija, east Java.

Bathygobius fuscus (Ruppell) * Figure 260 (Paknam)

Four, 42 to 64 mm, Rayong, one, 90 mm., Paknam Differs from Herre's grouping in coloration, greating suggesting *Rhinogobius baliuroides* (Bleeker).

Tukagobius ocellatus, new species Figure 261

Depth 5⅛ to 5⅗, head 3 to 3⅙, width 1¼ to 1⅜ Snout 3¼ to 3½ in head, eye 5⅓ to 5¾, 1⅜ to 1¾ in snout, greatly exceeds bony interorbital, maxillary reaches ⅜ to ½ in eye, length 2½ to 3⅛ in head, lower jaw slightly included, lips broad, smooth, thick, fleshy, tongue spatulate, slightly convex in front, teeth small, conic, simple, strong, uniform, in 4 or 5 rows in front of each jaw which narrow posteriorly, interorbital 6 to 7¼ in head, low, nearly level. Gill rakers 3 + 5, short, low, pointed, knoblike, about ⅜ of gill filaments, which ⅜ of eye

Scales 43 to 45 + 4 or 5 in median lateral series; 15 to 17 transversely between soft dorsal and anal origins, 18 to 22 predorsal scales forward to occiput Breast scaly Median naked strip, from behind ventrals to vent. Caudal base scaly Head naked, with very fine, inconspicuous and mostly short rows of papillae, best indicated by means of the accompanying figure Scales with 9 to 16 radiating basal striae, 33 to 50 apical denticles, circuli fine basally, coarser to obsolete apically

D. VI – I, 10, I or I, 11, I, third spine 1⅗ to 2 in head, first branched ray 2 to 2⅓, A I, 9, I, seventh branched ray 2 to 2⅕; caudal 1⅓ to 1⅗, convex behind, least depth of caudal peduncle 2⅔ to 3, pectoral 1¼ to 1⅜, rays 16; ventral I, 5, front edge of ventral disk as broad bilobate flap, fin length 1⅗ to 1⅞. Vent little nearer anal origin than tips of depressed ventrals, with rather long conic papilla ⅜ of eye

Brown, with 7 or 8 transverse ill defined saddles across middle of back, these variously distinct, variably wide or narrow, or even as double transverse bands, and usually with more or less mottled or marbled appearance, not extending on lower sides or under surfaces, which uniform whitish. Upper surface of head with variable brownish blotches, more or less streaked longitudinally Iris gray, jaws and lips dull brownish. First dorsal brownish, paler basally, and 5 dark blotches on each spine. Soft dorsal similar, with paler or whitish upper anterior border Caudal brownish, clouded or blotched with darker to blackish, especially in smaller specimens, and dark or blackish blotch at bases of upper rays usually large and distinct. Anal dark brown medially, pale basally and with broad whitish lower border Pectoral brownish, with small black, white-bordered ocellus at origin and more or less distinct whitish subbasal bar Ventral whitish.

A.N S P, No 68,248 Kemrat, Siam Length 103 mm Type. Also Nos 68,249 to 68,251, same data, paratypes Length 78 to 80 mm

Known by its coloration, especially the pectoral ocellus and dark blotch at the upper basal part of the caudal, though this less distinctive as sometimes an obscure lower or even median blotch may be present

(*Ocellatus* with eye-like spots)

Pseudogobiopsis oligactis (Bleeker)

Twelve, 28 to 42 mm , Bangkok I refer these specimens to the account by Koumans 1935, he mentioning six specimens of which one the type and two others from Bangpakong River, Siam

Vaimosa chulae H M Smith Figure 262

Depth 5; head 3⅜, width 1½ Snout 5⅛ in head, eye 4⅛, greater than snout, twice bony interorbital, maxillary reaches back little behind eye edge, length 2½ in head, mandible included in upper jaw, single row of very small, simple, curved, short, conic teeth along front edge of upper jaw, visible when mouth is closed, front of mandible with 4 large strong conic teeth, and set off near middle of each mandibular ramus several other rather large teeth, tongue adnate in front to floor of mouth, appearing rounded, interorbital width low, depressed Gill opening lateral, extends forward opposite hind preopercle edge

Scales 24 + 3 in median lateral series, 7 transversely between dorsal and anal origins; 11 predorsal scales forward to eyes Opercles scaly, muzzle, cheek, interorbital and under surface of head naked Row of minute close set papillae on suborbitals, close to eve, 3 parallel horizontal rows on cheek, and row along each lower face of mandibular rami Small scales on chest and breast, belly and caudal base also scaly Scales with 15 parallel slightly converging basal striae, 47 apical denticles, circuli fine

D. V – I, 7, I, second spine 1¾ in head, second dorsal height 1¼, A. I, 7, I, fin height 1½; caudal 1, convex behind, least depth of caudal peduncle 2⅛, pectoral 1⅓, rays 15, ventral I, 5, with even, entire membranous border in front, fin 1½ Vent little nearer anal origin than tips of depressed ventrals, papilla flattened, pointed, ½ of eye.

Pale brown, each scale on body with dark basal pocket, and 6 ill defined dark saddle-like blotches down middle of back, with 5 still paler alternating blotches axial along side Head with various dark spots. Iris grav Jaws dotted with gray and branchiostegal region with blackish gray First dorsal with gray brown, large blackish blotch on last 2 membranes Second dorsal pale, with 5 dark longitudinal bands Caudal grayish with 5 darker transverse bands and black spots, about size of pupil at bases of upper rays Pectoral pale, dusted with brownish, and blackish blotch above and another below basally Ventral rather dark gray, outer border whitish.

One, 41 mm , Tachin Known by its coloration, obtuse muzzle, large scales and fin formula It somewhat resembles *V. piapensis* Herre from the Philippines, but with greatly larger mouth and different coloration

Vaimosa spilopleura H M Smith Figure 279

One, 46 mm , Tachin

Glossogobius giuris (Buchanan-Hamilton)

Seven, 92 to 172 mm., Bangkok, one, 205 mm , Paknam; one, 103 mm , Tachin

Ctenogobius caninus (Valenciennes)

Two, 85 to 93 mm , Tachin

Ctenogobius viridipunctatus (Valenciennes) Figure 280

Five, 48 to 114 mm Tachin

Ctenogobius masoni (Day) Figure 281 (Paknam)

Depth 4⅗ to 4½, head 3 to 3¼, width 1½ to 1¾ Snout 3⅗ to 4⅛ in head from snout tip, eye 5⅓ to 6⅛, 1⅓ to 1½ in snout, subequal with interorbital, maxillary reaches ½ in eye, length 2⅓ to 2⅗ in head from snout tip, mandible slightly protrudes, broadly convex, tongue broad, rounded in front, teeth small, in narrow band in each jaw, with pair of small, curved, wide-set canines in each jaw anteriorly and another at middle of each mandibular ramus, interorbital 6 to 6¾, concave Gill rakers 6 + 12, mostly very short points, longest ½ of gill filaments, which subequal with eye

Scales 24 to 26 + 4 or 5 in median lateral series, 10 or 11 transversely at soft dorsal and anal origins, 21 or 22 predorsal scales forward to eye Few small scales on opercle above, head otherwise naked Row of fine close set papillae along suborbitals up over postocular region and back to suprascapula, row along upper edge of maxillary, 2 double rows horizontally on cheek, several rows on preopercle and opercle, row along each mandibular ramus and lower part of preopercle Small bilobate cutaneous flap on front of mandible or chin Prepectoral and caudal base scaly. Scales with 9 basal radiating striae, row of 9 or 10 apical denticles, circuli fine, basal, coarser apically

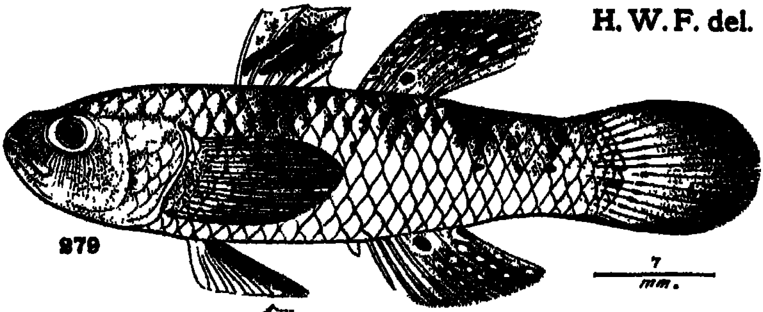
D VI – I, 9, i, fourth spine 2 to 2½ in total head length, second dorsal height 1⅗ to 2, A I, 9, i, fin height 1¾ to 1⅘, caudal 1 to 1⅓, ends in blunt median point behind; least depth of caudal peduncle 2¼ to 2⅘, pectoral 1⅓ to 1⅗, rays 17, ventral rays I, 5, with simple, entire, broad membrane in front, length 1½ to 1⅗ Anal papilla pointed, close before anal

Body and head pale or dull brown, with pale or pearly spot on each scale Iris gray Fins all dark to blackish gray, paired fins all little brownish basally

Four, 49 to 67 mm , Tachin, one, 62 mm , Paknam

Ctenogobius vexillifer, new species Figure 282.

Depth 4⅘, head 3⅓, width 1¼. Snout 4⅗ in head from snout tip, eye 4⅗, impinges on upper profile of head, equals snout, greatly exceeds interorbital, maxillary reaches opposite front eye edge, length 3⅘ in head from snout tip,



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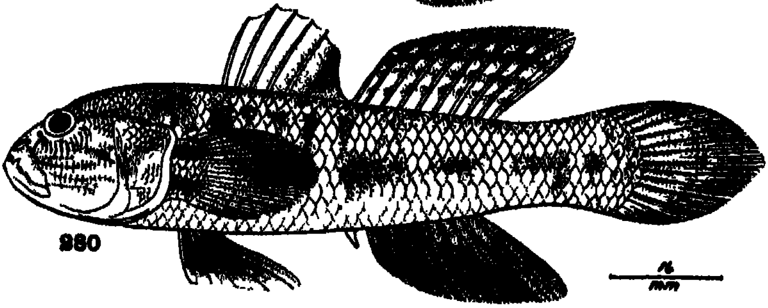

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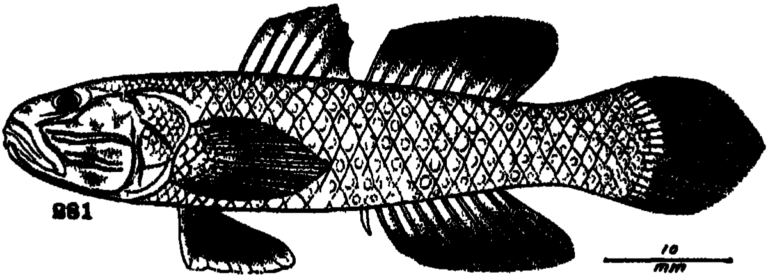

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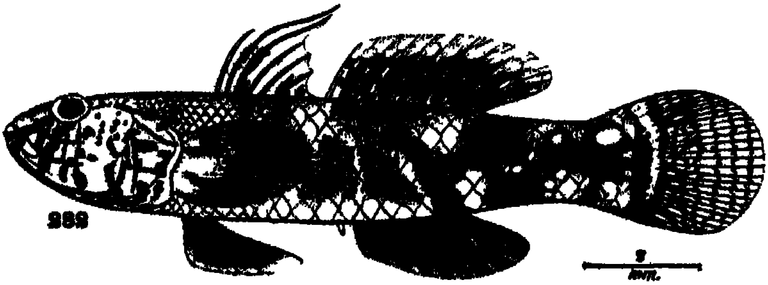


282

279 *Vaimosa spilopleura* 280 *Ctenogobius viridipunctatus.*
281 *Ctenogobius masoni* 282. *Ctenogobius vexillifer.*

mandible well protruded in front, with broad fleshy lips; band of small pointed teeth in each jaw, with 5 or 6 lower outer little enlarged curved canines, tongue, rounded, free in front, interorbital narrow, width about ¼ of eye, concave Gill opening extends forward about last half of postocular.

Scales 27 + 2 in median lateral series, 11 transversely at soft dorsal and anal origins, 10 predorsal extending about last ⅔ in postocular. Head naked, with 4 rows of fine papillae radiating down on cheek and crossed by median and terminal rows; row along lower face of mandible and lower part of preopercle, row forward from suprascapula, two rows on opercle. Breast and caudal base scaly Scales with 22 basal radiating striae, 39 or 40 apical denticles, graduated little shorter to apex of scale, circuli fine

D VI – I, 10, i, third spine 1⅜ in total head length, soft fin height 1⅗, A I, 8, i, fin height 2⅓, caudal 1, little convex behind, least depth of caudal peduncle 2¼, pectoral 1¼, rays 16, ventral rays I, 5, front membrane entire, rather broad, fin length 1⅗ Anal papilla flat, pointed, close before anal fin

Brown generally, under surfaces scarcely paler. Back with 5 variable blackish-brown saddle-like blotches, variously mottled paler and darker, and alternating with as many dark blotches along lower half of side Head marked with dark to blackish brown blotches, arranged as 5 inclined bars along lower side of head Dorsals grayish medially with blackish brown, broadly pale marginally Caudal with 6 or 7 transverse blackish brown bands; in basal half several reticulated to form rather broad band, 2 pale round spots, smaller than eye, at caudal base Anal gray, each membrane over great basal portion blackish Pectoral gray, with 2 blackish blotches basally, upper larger and preceded by conspicuous white spot Ventrals gray black, margin of disk whitish. Iris gray

A N S P., No 68,252 Bangkok, Siam Length 48 mm Type

Apparently related to *C hongkongensis* (Seale) 1910 in its squamation, though with less extended scaly predorsal region made up of fine scales The physiognomy is also quite different, the projecting mandible subvertically protruded in front, a ladder of papillae on the cheek, the front dorsal spines extended and the coloration quite different

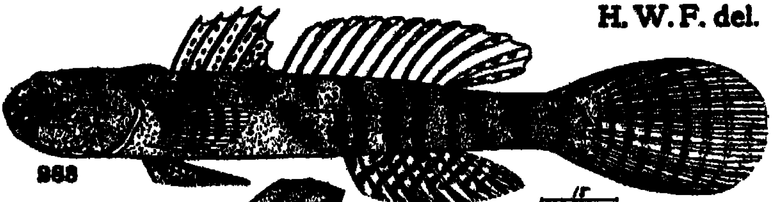
(*Vexillum* banner + *fero* to bear, with reference to the first dorsal fin)

Cryptocentrus maudae, new species Figure 283

Depth 6⅔, head 4, width 1⅔ Snout 5 in head from snout tip; eye 5⅓, 1⅛ in snout, greater than interorbital, maxillary reaches opposite ⅔ in eye, length 3 in head from snout tip; lips broad, fleshy, smooth, entire; bands of finely villiform teeth in jaws, with pair of wide set canines anteriorly in each, besides middle of each mandibular ramus with well-hooked canine pointing posteriorly; interorbital ½ of eye, level, and little below level of upper edges of eyes Gill opening extends forward opposite hind edge of preopercle Gill rakers 6 + 12, lanceolate, ⅔ of gill filaments or ½ of eye Inside gill opening below on shoulder girdle rather broad deep notch

Scales 90 + 4 in median lateral series; 33 transversely about anal origin; predorsal naked Rather long and slightly elevated convexity, with swollen appearance on predorsal immediately before dorsal fin. Head naked, with ladder-like arrangement of minute papillae on cheek, row back over post-

H. W. F. del.



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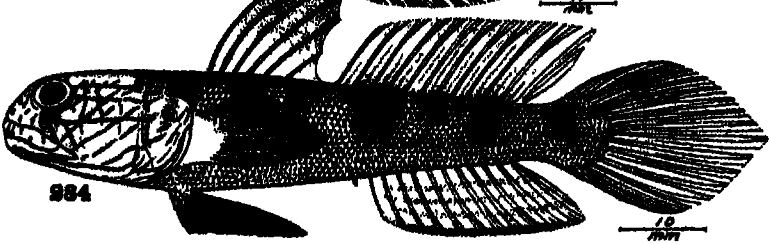

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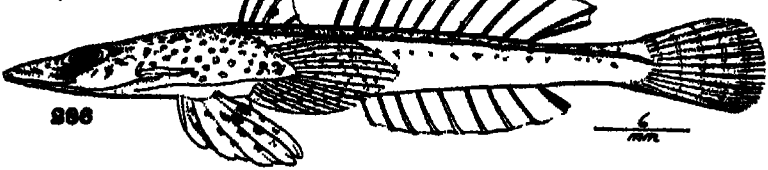

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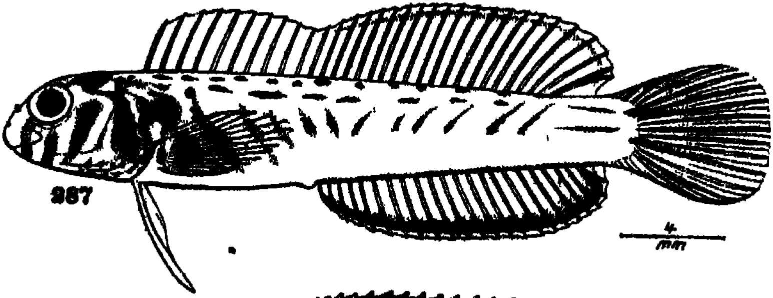

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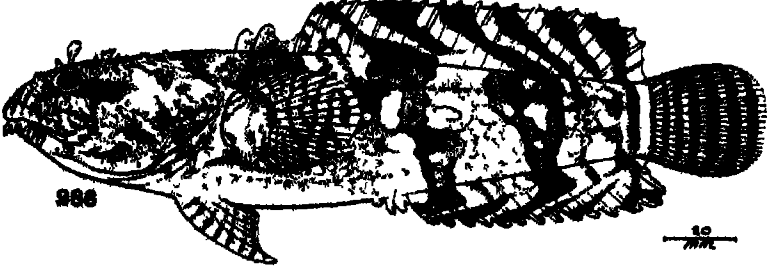


288

283 *Cryptocentrus maudae* 284 *Cryptocentrus wehrlei*
285, 286 *Callionymus fluviatilis* 287 *Petroscirtes dispar*.
288. *Pseudobatrachus eugeneius*

ocular, line along lower face of each mandibular ramus and preopercle, several bars on opercle, transverse intersection over top of head behind eyes with parietal extension back each side of occiput, very inconspicuous vertical bars of minute bead-like papillae, well spaced, along sides of body Chest, breast, and prepectoral regions naked Scales with 14 to 20 radiating striae, largely basal, circuli fine, basal, obsolete apically.

D VI, 11, I, fifth spine $1\frac{3}{4}$ in total head, soft fin height $1\frac{3}{8}$, A I, 10, I, fin height $2\frac{1}{8}$, caudal 3 in rest of fish, broadly expanded, ovoid, least depth of caudal peduncle $2\frac{3}{4}$ in total head, pectoral $1\frac{1}{4}$, rays 15, ventral rays I, 5, with broad, entire connecting membrane in front, fin $1\frac{1}{8}$ in total head length Anal papilla rather large, fleshy, truncate, little extruded

Largely brownish, with very numerous, little contrasted, close set, small paler spots, crowded to form obscure reticulated appearance over anterior half of body Thirteen dark to blackish transverse bands, most distinct on tail and several more or less paired Iris gray Jaws with obscurely defined darker blotches Fins pale to light gray Spinous dorsal with gray black blotches on spines, and smaller variable spots on membranes Each dorsal ray with 6 variable blackish brown blotches Anal with contrasted black sigmoid bands Caudal with about 10 transverse series of dark to blackish blotches Pectoral with 6 dark transverse variable bars Ventral dark gray, with whitish spots

A N S P, No 68,253 Bangkok, Siam Length 148 mm. Type

Only known from the above example, which appears unique in its coloration, dorsal and anal not reaching caudal and its small paired fins

(Named for Miss Maude de Schauensee, daughter of Mr and Mrs. Rodolphe Meyer de Schauensee)

Cryptocentrus wehrlei, new species Figure 284.

Depth $4\frac{1}{8}$, head 3, width $1\frac{4}{5}$ Snout $4\frac{3}{4}$ in head, eye $4\frac{4}{5}$, $1\frac{1}{10}$ in snout, greater than interorbital, maxillary reaches behind eye, length $2\frac{3}{8}$ in head, lips broad, fleshy, smooth, entire, band of fine, uniform, villiform teeth in each jaw, tongue with slight medial notch in front, interorbital width 2 in eye, level Gill opening lateral, extends forward in last half of postorbital region

Scales very small, largely uniform, 73 + 6 in median lateral series, 21 transversely, 22 predorsal forward $\frac{3}{5}$ of postocular region of head Breast and caudal base scaly Head and prepectoral region naked Ladder of minute papillae on postocular region and cheek, row of papillae along lower face of each mandibular ramus and lower part of preopercle, several bars of papillae on opercle. Scales with 18 or 19 basal radiating striae; circuli moderate, obsolete apically

D VI – 12, I, third spine $1\frac{1}{2}$ in head, soft dorsal height $1\frac{3}{4}$, A. 11, I, fin height 2, caudal 1, with obtuse median point behind, least depth of caudal peduncle $3\frac{3}{4}$, pectoral $1\frac{3}{8}$, rays II, 17, ventral I, 5, fin $1\frac{1}{4}$ Vent short, flattened, close before anal

Pale brown, general color largely uniform Back with 6 dark brown saddles, first, second, fourth and fifth most distinct. Also large dark rounded blotch size of eye at caudal base Dark blotch below eye Eye gray Two dark bars on side of snout, and 5 broken, parallel dark lines on side of head behind eye First dorsal gray, paler below Second dorsal pale to transparent, with brown line on each membrane between and parallel Anal pale, with 4 dark parallel longitudinal bands, outermost or border dark gray Ventral dark gray

A N S P , No 68,254 Bangkok, Siam Length 90 mm Type

Greatly like *Cryptocentrus leonis* H M Smith, but that species said to have scales " about 125 in longitudinal series from upper angle of branchial aperture and about 30 in transverse series between origin of second dorsal and anal " On " predorsal region scales to a point half way between gill opening and eyes, the scales small, about 33 in median line " In *C wehrlei* about 22 scales on predorsal Smith's species further differs in " Entire body a uniform reddish-brown without any markings," whereas *C wehrlei* has five dark cross bands *C leonis* was based on a specimen 135 mm long In general coloration, though without the dark oblique lines on the side of the head, *Biat luzonicus* Seale is somewhat suggestive

(For the late Richard W Wehrle, of Indiana, Penna , who obtained many collections of fishes for the Academy)

Apocryptodon malcolmi H M Smith

Eight, 145 to 177 mm , Bangkok, two, 103 to 143 mm , Tachin A re-examination of the types of *Boleophthalmus smithi* Fowler 1934, show them synonymous with the present species, and wrongly referred to *Boleophthalmus* The Bangkok and Tachin materials listed above, show a more definite color pattern than my drawing of the type The dark blotches along the bases of the dorsal fins are all extended obliquely forward to a dark, lateral, median axial blotch A gray streak extends down from the lower eye edge until opposite the hind end of the maxillary Lower eyelid free in all the specimens

Apocryptodon edwardi, new species

This species was also wrongly referred to *Boleophthalmus,* as *Boleopthalmus taylori* Fowler 1934, in these Proceedings, p 159, figure 128, based on No 60019 A N S P from Bangkok As it is now necessary to place it in *Apocryptodon* Bleeker 1874, where it is precluded by *A taylori* Herre 1927, I have substituted the above name, based on the designated haplotype The present collection contains an additional specimen, 205 mm long, from Tachin

(For Prof Edward H Taylor of the University of Kansas)

TAENIOIDIDAE

Taenioides anguillaris (Linnaeus)

Three, 113 mm., Bangkok.

TRYPAUCHENIDAE

Trypauchen vagina Schneider

Three, 166 to 198 mm., Tachin

CALLIONYMIDAE

Callionymus fluviatilis Day * Figures 285 (preopercular spine), 286

Depth 8¾ to 9½; head 3½ to 3¾, width 1 to 1⅕. Snout 3 to 3⅕ in head from snout tip, eye 2⅗ to 3½, greater than snout in small specimens to 1⅛ in snout with age, greatly exceeds narrow interorbital; maxillary extends ⅓ in eye, length 2¼ to 2⅓ in head from snout tip; lips narrow forward, lower laterally broad and fleshy, interorbital ⅓ of eye, little concave, preopercular spine nearly long as eye, with outer basal, short, antero-basal retrose spine, and besides strong terminal denticle 2 or 3 strong curved spines on inner edge

Skin smooth Lateral cutaneous ridge distinct, high along back, finally reaches caudal base medially

D IV – 10, I, second spine 2⅛ to 2¾ in head from mandible tip, soft fin height 2⅛ to 3¼, caudal 1⅛ to 1⅕, little convex behind, least depth of caudal peduncle 4¼ to 6, pectoral 1⅓, rays 16, ventral rays I, 5, fin 1⅓ to 1¼ in total head length. Vent close before anal, with small, conic papilla

Pale brown above, mottled with darker brown, numerous variable small spots, specks and dots. Row of dark spots along upper edge of cutaneous lateral keel, variable, best seen as viewed above Iris gray Under surfaces of head and body uniform whitish Fins largely pale to translucent, rays and spines of dorsals with dark spots, blackish on spines of first dorsal Four dull transverse bars on caudal, fading out below Pectoral specked with brown Several rows of rather large brown spots on ventral

Six, 37 to 50 mm , Bangkok Agrees with Day's description. He gives " First dorsal black, or only spotted, second with four or five rows of spots Upper half of caudal spotted Anal colourless." Described from the Hoogly at Calcutta, and said to reach 75 mm in length

ECHENEIDIDAE

Leptecheneis naucrates (Linnaeus)

Two, 232 to 234 mm , Bangkok, two, 206 to 238 mm , Rayong, fourteen, 119 to 265 mm., Paknam

BLENNIIDAE

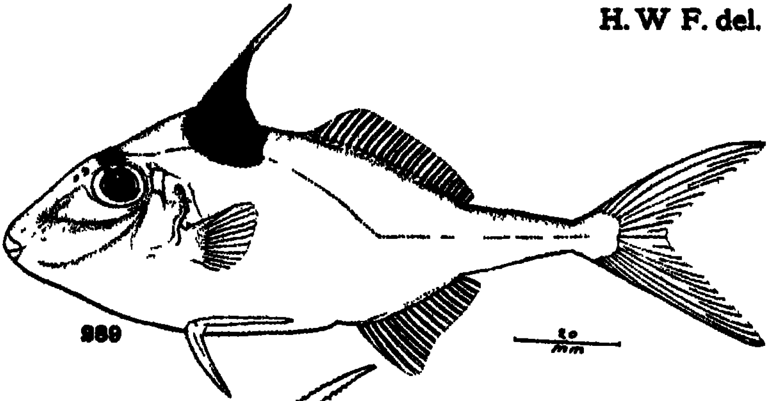
Petroscirtes dispar, new species Figure 287

Depth 5⅓, head 3⅗, width 1⅘ Snout 4⅘ in head; eye 3⅘, greater than snout, greatly exceeds interorbital, mouth cleft reaches ⅗ in eye, length 4½ in head, teeth firmly erect, close set, pointed, with 2 pairs of canines in mandible of which anterior pair shorter and posterior pair greatly longer; interorbital narrow, width ⅗ of eye. Gill opening with distinct fold down across isthmus, only free below to bases of upper pectoral rays, its length 3⅓ in head.

Skin smooth Hind nostril in small tube Head and body without ridges, keels or cirri.

D X, 20, fins scarcely notched, spines and rays flexible, first fin height 2⅓ in head, second fin height 1⅘; A. I, 21, fin height 2; caudal 1¼, convex behind, least depth of caudal peduncle 2⅓; pectoral 1⅓, rays 14, ventral rays 2, fin 1¼ in head. Vent with convex, low, fleshy papilla.

H. W F. del.



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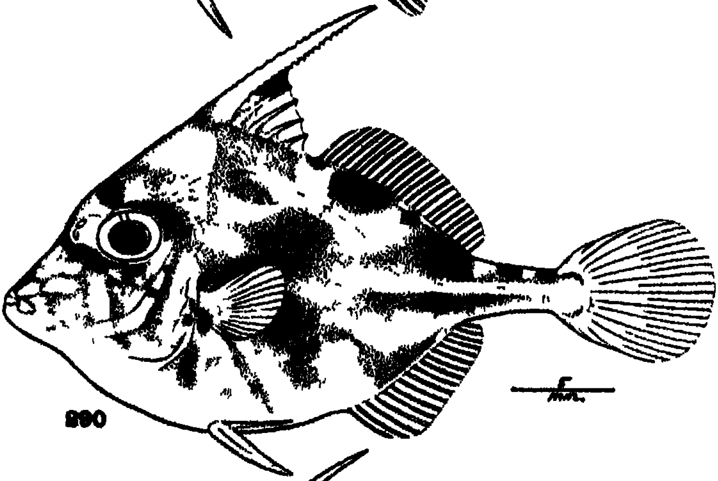

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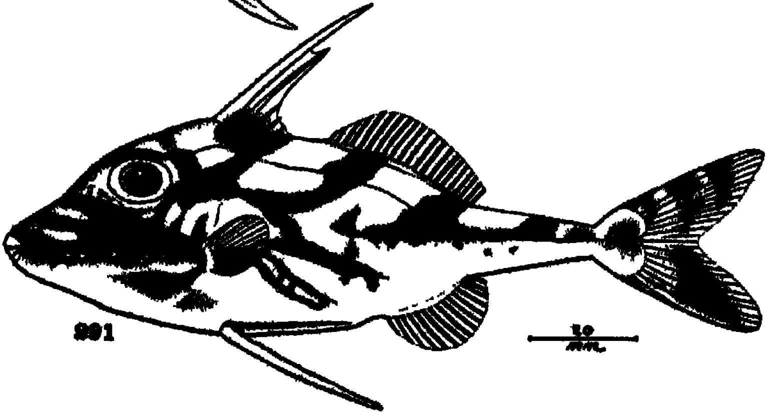


291

289 *Triacanthus brevirostris* 290 *Triacanthus oxycephalus*
291 *Triacanthus strigilifer*

Head and body very light brown, belly and under surfaces whitish Five transverse dark brown bands on head, with some spots on branchiostegal region Two rows of dark brown spots along each side of back Side of body with 12 dark brown bars transversely, first 6 inclined backward, and others forward Iris gray Fins translucent, soft dorsal with submarginal gray band, anal with dark brown submarginal band, and 2 dark bars from base on caudal besides dark lower border to fin Pectoral with dark median spot, and much larger dark brown subbasal blotch

A N S P, No 68, 255 Bangkok, Siam Length 29 mm Type

Closely related to *Petroscirtes masyae* H M Smith, based on 2 specimens 53 to 59 mm long from the Chantaboon estuary My specimen differs so strikingly in coloration that it appears to me distinct *P masyae* is described with 10 or 11 dark green cross bars on the back which meet at the median dorsal line Smith describes 5 longitudinal dark green lines on the back and sides (in no way present in my specimen), the upper and longest immediately below the cross bars, extending from head to under posterior dorsal rays, other lines progressively shorter, fourth and fifth confluent behind pectoral and extending about half length of body The head is described with 3 dark brown cross bands

(*Dispar* unlike, as the dark lateral bars diverge)

BATRACHOIDIDAE

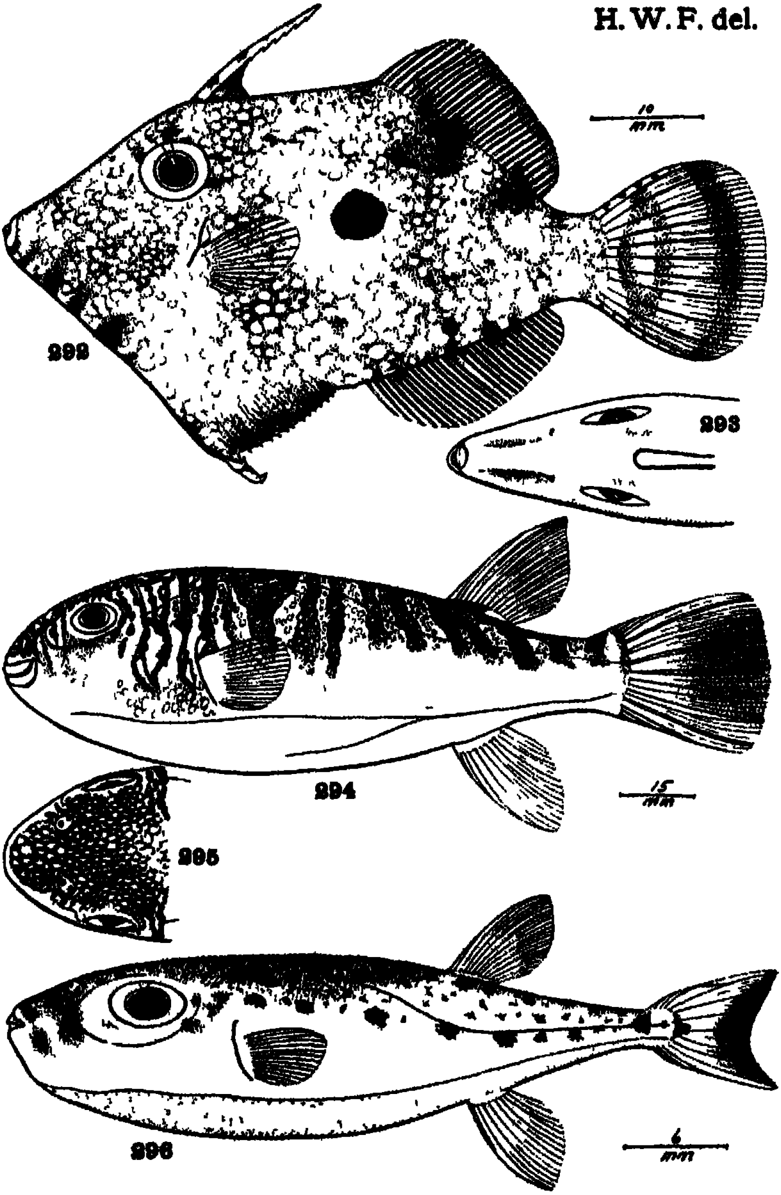
Pseudobatrachus eugeneius, new species. Figure 288

Depth 4, head 3, width 1 Snout 5½ in head from snout tip, eye 6, 1¼ in snout, 1¾ in interorbital, maxillary extends little behind eye, expansion 1⅛ in eye, length 2½ in head from snout tip, lips thick, fleshy, mandible well protruded, teeth small, strong, short, conic, in 3 or 4 series in front of jaws, interorbital 4 in head from snout tip, level; opercle ends in 2 strong spines and another strong one below Gill opening before pectoral base, length 3¾ in head

Skin rather thin and loose, smooth Eye with 2 flaps above, hind one long as eye, and arch of 7 short flaps on suborbitals, short scattered flaps on top of broad head, 5 flaps along each side of chin, several fringed flaps over expansion of maxillary, with 2 on end of latter largest, preopercle fringed, with 4 large flaps, also some filaments on opercles Short inconspicuous skinny points scattered on body.

D II, 21, spines short, erect, posterior longer or long as eye, soft fin height 3 in total head, A. 16, fin height 3; caudal 1⅔, convex behind, connected by basal membrane with last dorsal and anal rays, pectoral 1¼, rays 15, ventral rays I, 2, fin 1¼ Vent close before anal, with short fleshy, pointed papilla

Light brown, with 4 irregular, large, darker, marbled areas, the whole variegated with darker and light cloudings. Iris gray Dark bar down from lower hind eye edge Under surfaces of body uniformly pale drab to whitish Fins all very light or pale brown, soft dorsal with 6 obliquely parallel dark bars, anal with 6 dark bars but inclined opposite to those on soft dorsal; caudal with 7 dark transverse bands, those basally narrower; paired fins with narrow irregular dark cross bars



292, 293 *Stephanolepis choirocephalus* *294, 295* *Lagocephalus oblongus*
296 *Lagocephalus sceleratus.*

A N S.P , No. 68,256. Rayong, Siam Length 218 mm Type

An interesting species evidently related to *P trispinosus* (Gunther) It differs in coloration, the dorsal and anal connected with the caudal, proportions, and apparently with more filaments on the head *P dussumieri* (Valenciennes) is shown with a rude figure having a greatly broader interorbital

(For the late Eugene Smith, an aquarist interested in the fishes about New York City, to whom I am indebted for details and materials from his region)

Corysichthys gangene (Buchanan-Hamilton)

One, 160 mm , Paknam Caudal atrophied and small

TRIACANTHIDAE

Triacanthus brevirostris Schlegel Figure 289

Four, 130 to 143 mm., Paknam Soft dorsal 23 or 24, A 17 or 18

Triacanthus oxycephalus Bleeker Figure 290

Four, 31 to 98 mm , Paknam Soft dorsal 23 to 25, A 17 to 19

Triacanthus strigilifer Cantor. Figure 291

Fourteen, 116 to 205 mm , Rayong Soft dorsal rays 20 to 22, A 15

MONACANTHIDAE

Monacanthus chinensis (Bloch)

Two, 70 to 73 mm , Paknam, seven, 113 to 164 mm , Rayong

Stephanolepis choirocephalus (Bleeker) Figures 292, 293 (head above)

Depth 1⅗, head 3⅛, width 2 Snout 1¼ in head; eye 2⅔, 2 in snout, 1 in interorbital, mouth small, level with pectoral origin, interorbital elevated convexly Gill opening small, about ¾ of eye

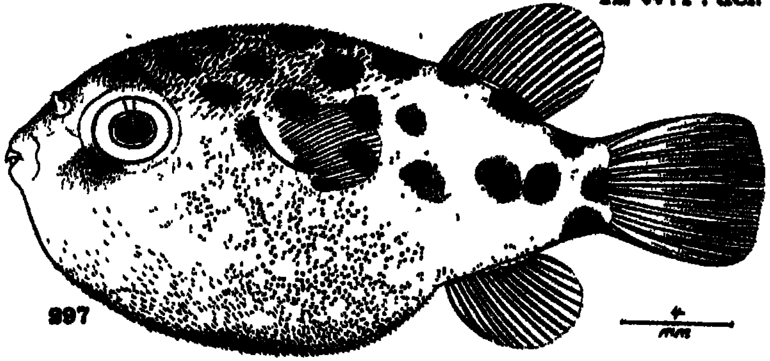
Skin finely roughened No spines on caudal peduncle No lateral line

D II - 28, first spine 1⅛ in head, each hind edge with row of 9 antrorse strong denticles, second fin height 2, A 29, fin height 2⅛, caudal $1\frac{1}{16}$, convex behind; least depth of caudal peduncle 2⅓, pectoral 1⅘, rays 15, pubic spine divided by hinge, end with spine hooked back each side, and followed by low membrane with row of very slender spines, of which only tips slightly protrude

Dull drab, with slightly darker mottling Rounded blackish spot, nearly large as eye, on middle of side Several dark blotches along lower profile of head. Various dark blotches at bases of dorsal and anal. Fins pale, caudal with 3 dark transverse bands Iris gray

One, 71 mm , Paknam Apparently closer to this species than any other known, though Bleeker's figure of "*Monacanthus choirocephalus*" apparently quite inaccurate, as he shows the gill opening above the origin of the pectoral and its upper portion approaching very close to the eye. Though the color pattern of its tail is somewhat similar, the posterior transverse

H. W. F. del.



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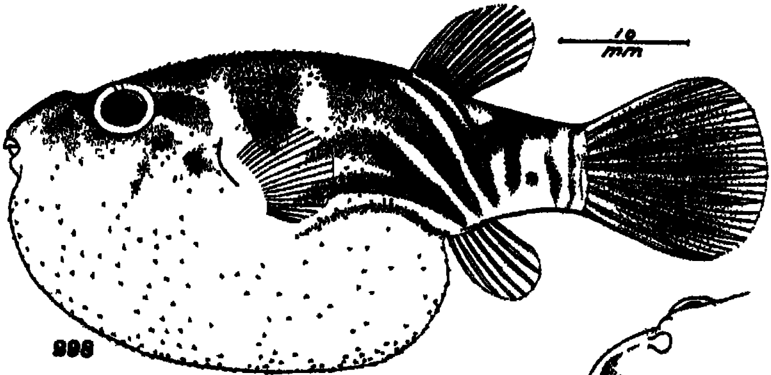

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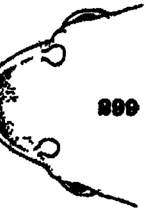

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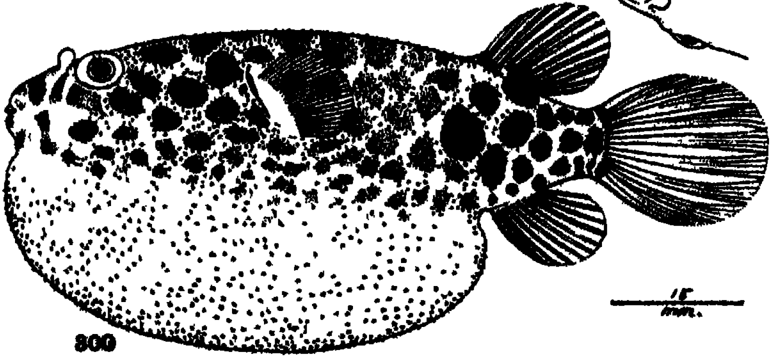

300

297 *Dichotomycter fluviatilis* 298 *Tetrodon immaculatus*
299 to 300 *Tetrodon leiurus*

dark band is shown as marginal, not submarginal as in my specimen. Moreover 2 dark lateral blotches are shown above and behind the pectoral. His figure shows 29 soft dorsal rays and the anal with 28, his description giving 28 and 30 respectively His later figure of *Paramonacanthus choirocephalus* is also crude, though with a single dark median lateral blotch This figure differs in the spinescent outer section of the hinged pubic spine

Alutera monoceros (Linnaeus) *

One, 213 mm , Rayong

TETRODONTIDAE

Lagocephalus oblongus (Bloch) * Figures 294, 295 (head above)

One, 158 mm , Rayong

Lagocephalus sceleratus (Gmelin) * Figure 296

One, 48 mm , Rayong

Lagocephalus lunaris (Schneider) *

One, 35 mm., Tachin, one, 35 mm , Pitsanulok, six, 42 to 61 mm., Rayong, three, 77 to 105 mm , Paknam

Dichotomycter fluviatilis (Buchanan-Hamilton) * Figure 297

Four, 28 to 40 mm , Tachin

Tetrodon immaculatus Schneider * Figure 298

Four, 58 to 83 mm , Kemrat These show the interorbital space and top of the head flat though both Gunther and Day describe it as very broad and convex, or slightly convex Day, likewise Bleeker, have figured the interorbital as somewhat raised above the eye

Tetrodon leiurus Bleeker * Figures 299 (head above), 300

Depth (contracted) 3½, head 2½, width 1¼ Snout 3⅜ in head, eye 5, 1⅜ in snout, 3 in interorbital, lips broad, thick, fleshy, feebly though distinctly plicate, mouth below eye or about on level with middle of pectoral base, interorbital 1⅝ in head, low and flat Gill opening oblique, length 4¼ in head

Head and body largely spinescent, except smooth muzzle, concealed axillary region behind pectoral, and caudal peduncle Lateral line not evident

D. II, 11, fin height 2⅛ in head, A I, 9, fin height 2⅓, caudal 1½, convex behind, least depth of caudal peduncle 3¾, pectoral 3⅜, rays 23, base of fin exceeds its length

Back dark drab brown, sides below paler and under surfaces whitish. Whole back and sides with numerous, large, close set darker blotches, most on back subequal with orbit and one midway on side between dorsal and anal origins large and black Iris gray Fins all drab

One, 81 mm , Pitsanulok.

ZOOLOGICAL RESULTS OF THE GEORGE VANDERBILT AFRICAN EXPEDITION OF 1934. PART VII,—REPTILES AND AMPHIBIANS

BY ARTHUR LOVERIDGE

The herpetological material on which this report is based, forms part of the zoological collections obtained by the George Vanderbilt trans-African Expedition of the Academy of Natural Sciences of Philadelphia, an expedition made possible by the generosity of Mr Vanderbilt.

Detailed information regarding the localities from which the specimens were obtained, will be found in Part I of this series in which Mr. J A G. Rehn deals with the itinerary[1] His article is accompanied by a map It might be as well to state here, however, more precisely the whereabouts of three Belgian Congo localities that furnished many reptiles The first of these is Njiana Farm which lies between Bunia and Irumu in the Kibali-Ituri District, the second, Saidi's Village, is on the Irumu-Avakubi road, ten miles west of Epulu River Ferry and also in the Kibali-Ituri District Ekibondo's Village on the other hand is between Dingba and Dungu, Uele District The *following abbreviations have been employed for the larger* political areas B C. *for* Belgian Congo. C *for* Cameroons F E A *for* French Equatorial Africa K C *for* Kenya Colony U *for* Uganda Protectorate.

All localities have been arranged in order of the itinerary and consequently across the continent from east to west The modernized rendering of each type locality is given following the citation.

After the scientific personnel had sailed from Africa a few specimens were added, presumably from Kribi but not properly labeled. It has been deemed best to indicate such with the addition " label detached " to avoid error. The same applies to a few individuals, probably from Kitala, whose linen tags became undecipherable in transit

The collection consists of 428 reptiles representing 66 species and 155 amphibians of 29 species It will be noted that all the more important venomous snakes—four species of cobra, two forms of mamba, and the three large puff adders—were encountered The chief importance of the collection lies in the material from French Equatorial Africa, a region from which but few specimens have reached any American museum. Now that they are made available to taxonomists these specimens will prove valuable as supplying a long-felt want to those engaged in comparative studies.

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[1] 1936, Proc Acad Nat Sci Phila, 88, pp. 1-14

The only taxonomic changes involved in the present report are the synonymizing of *Eremias nitida garambensis* Schmidt with *E. n. quadrinasalis* Chabanaud, an unfortunate necessity in view of Chabanaud's name which was based on an aberrant individual displaying four nasals on one side of the head only. *Ahaetulla heterolepidota* Gunther, with its synonyms *gracillima* Gunther, *gracilis* Sternfeld and *bequaerti* Schmidt can no longer be regarded as distinct from the very variable *Chlorophis irregularis* (Leach).

Some notes on stomach contents, breeding condition and parasites are included. In this connection I wish to acknowledge my appreciation of my colleagues, Dr. G. M. Allen (mammals), the late Dr. W. M. Wheeler (ants), Mr. Nathan Banks (insects), and Dr. J. H. Sandground (nematodes), for identifying certain prey or parasites as noted in the text. Mr. H. W. Parker of the British Museum has kindly compared the tree frog of the genus *Megalixalus* with the type of *immaculatus* in his care.

LIST OF SPECIES COLLECTED

TESTUDINIDAE

Kinixys erosa (Schweigger)
Kinixys homeana Bell

PELOMEDUSIDAE

Pelusios nigricans nigricans (Donndorff)
Pelusios gabonensis (Duméril)

TYPHLOPIDAE

Typhlops punctatus punctatus (Leach)

BOIDAE

Python sebae (Gmelin)
Calabaria reinhardtii (Schlegel)

COLUBRIDAE (COLUBRINAE)

Natrix olivacea olivacea (Peters)
Hydraethiops melanogaster Gunther
Bothropthalmus lineatus lineatus (Peters)
Boaedon lineatus Duméril & Bibron
Boaedon olivaceus (Duméril)
Lycophidion capense capense (Smith)
Mehelya capensis (Smith)
Chlorophis irregularis (Leach)
Philothamnus semivariegatus semivariegatus Smith
Gastropyxis smaragdina (Schlegel)
Hapsidophrys lineata Fischer
Thrasops jacksonii jacksonii Gunther
Grayia smythii (Leach)
Prosymna bocagii Boulenger
Scaphiophis albopunctatus Peters

COLUBRIDAE (DASYPELTINAE)

Dasypeltis scaber (Linnaeus)

COLUBRIDAE (BOIGINAE)

Boiga pulverulenta (Fischer)
Boiga blandingii (Hallowell)
Crotaphopeltis hotamboeia hotamboeia (Laurenti)
Psammophis sibilans (Linnaeus)
Psammophis punctulatus Dumeril & Bibron
Thelotornis kirtlandii (Hallowell)
Dispholidus typus (Smith)
Elapops modestus Gunther

COLUBRIDAE (ELAPINAE)

Elapsoidea guntherii Bocage
Naja haje haje (Linnaeus)
Naja melanoleuca Hallowell
Naja nigricollis nigricollis Reinhardt
Dendraspis jamesoni jamesoni (Traill)
Dendraspis jamesoni kaimosae Loveridge

VIPERIDAE

Causus resimus (Peters)
Bitis arietans (Merrem)
Bitis gabonica (Duméril & Bibron)
Bitis nasicornis (Shaw)
Atheris squamigera (Hallowell)
Atractaspis irregularis (Reinhardt)

GEKKONIDAE

Hemidactylus fasciatus Gray
Hemidactylus brookii Gray

AGAMIDAE

Agama agama agama (Linnaeus)
Agama agama lionotus Boulenger
Agama atricollis Smith

VARANIDAE

Varanus exanthematicus (Bosc)
Varanus niloticus (Linnaeus)

LACERTIDAE

Algiroides africanus Boulenger
Eremias nitida quadrinasalis Chabanaud

SCINCIDAE

Mabuya maculilabris (Gray)
Mabuya perrotetii (Duméril & Bibron)
Mabuya quinquetaeniata obsti Werner
Mabuya quinquetaeniata scharica Sternfeld

Mabuya varia varia (Peters)
Mabuya striata (Peters)
Riopa fernandi (Burton)
Riopa sundevallii (Smith)

ANELYTROPIDAE

Feylinia currori elegans (Hallowell)

CHAMAELEONTIDAE

Chamaeleo senegalensis Daudin
Chamaeleo gracilis gracilis Hallowell
Chamaeleo bitaeniatus bitaeniatus Fisher
Chamaeleo bitaeniatus hohnelii Steindachner
Chamaeleo cristatus Stutchbury

PIPIDAE

Xenopus mülleri (Peters)
Xenopus fraseri Boulenger
Xenopus tropicalis (Gray)

BUFONIDAE

Bufo superciliaris Boulenger
Bufo regularis regularis Reuss
Bufo regularis subsp ?
Bufo camerunensis camerunensis Parker
Bufo funereus Bocage
Bufo vittatus Boulenger

POLYPEDATIDAE

Leptopelis aubryi (Duméril)
Megalixalus sp
Hyperolius pleurotaenius (Boulenger)
Hyperolius concolor (Hallowell)
Hyperolius rossii (Calabresi)
Hyperolius schubotzi Ahl
Hyperolius nasutus Gunther

RANIDAE

Astylosternus diadematus Werner
Rana goliath Boulenger
Rana crassipes Buchholz & Peters
Rana occipitalis Gunther
Rana ornata (Peters)
Rana fuscigula chapini Noble
Rana oxyrhynchus oxyrhynchus Smith
Rana mascareniensis venusta Werner
Rana galamensis galamensis Duméril & Bibron
Rana albolabris Hallowell
Arthroleptis poecilonotus Peters
Phrynobatrachus ? acutirostris Nieden
Hemisus marmoratum guineensis Cope

Species and Localities

TESTUDINIDAE

Kinixys erosa (Schweigger)

Testudo erosa Schweigger, 1814, Prodr Monog Chelon, p 52 No locality

♀ ♀ (A N S.P , 20769-70) Saidi's Village, B C 7-9 ix. 34
Young (A N.S P , 20474). Ekibondo's Village, B C 1. x 34
♂ ♀ (A.N.S P., 20766-7) Nola, F E A 31 x & 1 xi 34

Variation. No nuchal except in No 20767, anterior extremity of plastron projecting beyond carapace, posterior part of carapace sloping

Measurements The ♂ (A N S P , 20766) measures 230 mm , the largest ♀ (A N S.P , 20767) 208 mm The young one 65 mm long, by 52 mm broad, by 26 mm deep.

Kinixys homeana Bell

Kinixys Homeana Bell, 1827, Trans. Linn Soc London, 15, p. 400, pl xvii, f 2: West Africa

♂ (A N S P , 20768) Near Saidi's Village, B C 9 xi 34

Variation A nuchal, anterior extremity of plastron not projecting beyond carapace, posterior part of carapace descending vertically

Measurements ♂ , 170 mm

PELOMEDUSIDAE

Pelusios nigricans nigricans (Donndorff)

Testudo nigricans Donndorff, 1798, Zool Beytr des Linn Natur , 3, p 34 No locality.

♀ (A N S P , 20780) Near Saidi's Village, B C 9 xi 34.

Measurements ♀ , 160 mm.

Pelusios gabonensis (Dumeril).

Pentonyx gabonensis Dumeril, 1856, Rev Mag Zool (2), 8, p 373 Gaboon, French Equatorial Africa.

1 hgr. (A.N S P , 20454) Saidi's Village, B C 5 ix 34
2 yng (A N S P , 20397-8) Nola, F. E. A 28 x. 34

Measurements The largest is only 100 mm long, by 73 mm broad, by 40 mm deep.

TYPHLOPIDAE

Typhlops punctatus punctatus (Leach)

Acontias punctatus Leach, 1819, in Bowdich, Miss Ashantee, p 493 Fantee, Gold Coast.

1 (A N.S.P., 20297). Njiana Farm, B C. 29. viii.-2 ix 34
4 (A.N S.P , 20290, 20347, 20500, 20785) Ekibondo's Village, B. C. 22-30. ix. 34.
1 (A.N.S.P., 20779). Nola, F. E. A 5. xi. 34
2 (A.N.S.P , 20348, 20784). Gounguru, F. E. A. 7. xi. 34
3 (A.N.S.P., 20697, 20707, 20713). 30 km e. of Kribi, C. 19-28. xi 34.

Variation. Midbody scale-rows 26-32; prefrontal rather less, or slightly more than twice the size of a supraocular, separated from (Nos 20500, 20697), or narrowly (Nos 20297, 20785), or broadly (Nos. 20347, 20707) in contact with the nasal which is only semidivided in all specimens; eye distinguishable; diameters are included in the length from 20 (largest but one) to 41 (smallest) times

Coloration. All are of the typical *punctatus* type of pigmentation except Nos 20348, 20697 and 20779 which agree with *congestus* Duméril & Bibron The latter had no type locality but occurs together with the typical form of coloring at Kribi and elsewhere in the Cameroons

Measurements The largest (A N S P , 20785), possibly a ♂, measures 655 (645 + 10) mm., the largest ♀ (A N S.P , 20779) 600 (585 + 15) mm , the smallest (A N S P , 20764) 165 mm

Breeding On November 11, the latter held numerous developing ova measuring about 20 × 11 mm.

Diet Termites in one examined

BOIDAE

Python sebae (Gmelin)

Coluber Sebae Gmelin, 1788, Syst Nat, ed 13, p 1118 "America"

♀ (A N S P , 20784) Ekibondo's Village, B C 27 ix 34

Variation Midbody scale-rows 90, ventrals 277, anal single, subcaudals 66, labials 14 The body has been skinned out neatly

Calabaria reinhardtii (Schlegel)

Eryx reinhardtii Schlegel, 1848, Bijdr tot de Dierk, 1, p 2, pl — Gold Coast

♀ (A N S P , 20508) Ekibondo's Village, B C 27 ix 34
♀ ♀ (A N S P , 20756, 20758) Possibly Kribi, label detached.
♂ (A N S P , 20663) 30 km e of Kribi, C 24-29 xi. 34

Variation Midbody scale-rows 32-34, ventrals 228-233; anal entire, subcaudals 22-26, labials 8, the third and fourth, or fourth only, entering the orbit, preocular 1, postoculars 2

Measurements The ♂ (A N.S P , 20663) measures 627 (575 + 52) mm ; the largest ♀ (A N S P , 20508) 800 (730 + 70) mm

Parasites Two ticks were attached to the snake from Ekibondo's Village

COLUBRIDAE

Natrix olivacea olivacea (Peters)

Coronella olivacea Peters, 1854, Monatsb Akad Wiss Berlin, p 622 Tete, Mosambique

2 (A.N S P., 20182, 20814) Kitala, U 8-15 viii 34

Variation Midbody scale-rows 19; ventrals 146; anal divided; subcaudals 53; labials 8, the fourth and fifth entering the orbit; preocular 1, postoculars 3, temporals 1 + 2.

Measurements The larger juvenile (A N.S.P , 20182) measures 183 (146 + 37) mm

Hydraethiops melanogaster Günther

Hydraethiops melanogaster Gunther 1872, Ann Mag Nat Hist (4), 9, p 28, pl iii, fig G Gaboon, French Equatorial Africa

3 (A N S.P , 20665, 20700-1) 30 km e Kribi, C 24-28 xi 34
1 (A.N S.P , 20764) Probably Kribi, label detached.

Variation Midbody scale-rows 23, ventrals 147-148, anal divided, subcaudals 44-56, labials 10-11, the fourth, fifth and sixth, or fifth and sixth, or sixth and seventh, or fifth, sixth and seventh entering the orbit, preocular 1, postoculars 1-2, temporals 1 + 2

Measurements The larger ♂ (A N S P , 20701) measures 466 (372 + 94) mm , the larger ♀ (A N S P , 20764) 523 (430 + 93) mm

Bothropthalmus lineatus lineatus (Peters)

Elaphis (Bothropthalmus) lineatus Peters, 1863, Monatsb Akad Wiss Berlin, p 287 Guinea
Bothropthalmus melanozostus Jan, 1863, Elenco, p 62, and 1867, Icon Gén , 20, pl v Gold Coast

♀ (A N S P , 20336) Fort Sibut, F E A 13 x 34

Variation Midbody scale-rows 23, ventrals 192, anal entire, subcaudals 70, labials 8, the fourth and fifth entering the orbit, preoculars 2, postoculars 2, temporals 2 + 3

Coloration This is an interesting, apparently undescribed color variant of a common West African species Instead of the five light, longitudinal, dorsal lines, it has only a red, hair-like, vertebral line on the dorsum with traces of a lateral one on either side of the tail This results in its presenting a strongly distinct appearance from that of the typical form as figured by Jan, and which has a transcontinental range from the Gold Coast eastward to Uganda

To the south occurs a uniformly, or almost uniformly, colored race, *B l brunneus* Gunther of Fernando Po, with which I would unite *infuscatus* Buchholz & Peters, *modestus* Fischer and *olivaceus* Muller all of which were described from the Cameroons

Measurements Total length 898 (733 + 165) mm.

Boaedon lineatus Duméril & Bibron

Boaedon lineatus Duméril & Bibron, 1854, Erpet Gén , 7, p 363 Gold Coast

♂ (A N.S P , 20183) Kitala, U 8-15 viii 34
♂ ♀ (A N S P , 20148, 20296). Njiana Farm, B C. 29-31 viii 34
♀ (A.N S P., 20509). Vube, B C 16-21. ix 34
♂ (A.N S P , 20343) Fort Sibut, F. E A. 14-18 x 34
♂ (A N.S P , 20679). Batangafo, F E. A 7-13. xii. 34.
♂ ♂ (A N.S.P , 20708-9) 30 km e Kribi, C 19-28. xi 34
♂ (A.N.S.P , 20815). Probably Kribi, label detached

Variation. Midbody scale-rows 29-31; ventrals 200-229, anal entire; subcaudals 47-63; labials 8-9, the fourth and fifth, fifth and sixth or fourth, fifth and sixth entering the orbit, preoculars 1-2, postoculars 2; temporals 1 + 2 or 1 + 3; parietal shields longer than the distance between the frontal and end of the snout

Measurements The largest specimen, a ♀ (A.N.S.P., 20148) measures 854 (742 + 112) mm.

Diet. One stomach examined, held a gecko (*Hemidactylus brookii*).

Boaedon olivaceus (Duméril)

Holuropholis olivaceus A Duméril, 1856, Rev Mag Zool (2), 8, p. 466 Gaboon, French Equatorial Africa.

5 ♂♂ (A N S P , 20275, 20504, 20744, 20747-8) Saidi's Village, B C. 3-16 ix 34

2 ♂♂ (A N.S P., 20246, 20335) Nola, F. E. A 27 x -2 xi. 34

Variation. Midbody scale-rows 27-29, ventrals 191-208, anal entire; subcaudals 41-53, labials 7-10, usually 8, the third and fourth, third, fourth and fifth, fourth and fifth, or fifth, sixth and seventh entering the orbit; preocular 1, loreal entering the orbit below the preocular in both the Nola snakes; postoculars 2; width of frontal contained from 1⅛ to 1¼ times in its length, the latter equalling its distance from the end of the snout except in No 20747 where it equals its distance from the rostral.

Measurements The largest ♂ (A.N S.P , 20744) measures 733 (642 + 91) mm

Diet. Stomachs of two examined, held mice.

Lycophidion capense capense (Smith)

Lycodon capensis A Smith, 1831, S Afr Quart Journ, 1, p 18 Kurrichane, i. e Rustenberg district, Transvaal

♂ (A N S.P., 20301) Njiana Farm, B C 29-31. viii 34

Variation Midbody scale-rows 17; ventrals 211; anal entire, subcaudals 42, labials 7, the third, fourth and fifth entering the orbit, preocular 1, postoculars 2, temporals 1 + 2; parietals longer than the distance between the frontal and end of the snout.

Measurements Total length 477 (415 + 62) mm

Mehelya capensis (Smith)

Heterolepis capensis A Smith, 1847, Illus. Zool. S Africa, Rept, pl lv Eastern districts of Cape Province, Union of South Africa

1 (A N.S P , 20715) Batangafo, F E. A. 16-19 x. 34

Variation Midbody scale-rows 15; ventrals 232; anal entire; subcaudals 37+; labials 7, the third and fourth entering the orbit, preocular 1; postoculars 2; loreal 1; temporals 1 + 2.

Measurements. Length from snout to anus 1295 mm., tail mutilated.

Chlorophis irregularis (Leach).

Coluber irregularis Leach, 1819, in Bowdich, Miss Ashantee, p 494· Ashanti, Gold Coast

Ahaetulla heterolepidota Gunther, 1863, Ann Mag Nat Hist (3), 2, p 286 Africa.

♂ ♂ (A N S.P , 20338-9) Fort Sibut, F E. A. 13 x 34
♀ (A N.S P , 20711) 30 km e. Kribi, C 24 xi. 34

Variation Midbody scale-rows 15, ventrals 158-177; anal divided, subcaudals 109-118, labials 9, the fourth, fifth and sixth entering the orbit, preocular 1; postoculars 2; temporals 1 + 1

I fail to see sufficient grounds for regarding *heterolepidotus* (Gunther) as distinct, nor even maintaining the latter as a race in view of their ranges being practically coextensive Boulenger (1915, pp 204-205) gives that of *irregularis* as " Senegambia and Uganda to Angola and Southern Rhodesia " while for *heterolepidotus,* he says, " Tropical Africa from the Gold Coast to Angola, eastwards to the Coast of Zanzibar "

He distinguishes them as follows

Preocular in contact with or narrowly separated from frontal; ventrals 150-182; subcaudals 90-133 . . *irregularis*
Preocular separated from frontal, body very slender anteriorly, ventrals 175-190, subcaudals 115-190 . *heterolepidotus*

Now it will be noted that in the key to this genus in the Catalogue of Snakes, Boulenger (1894, 2, p 92) gives the subcaudals as 115-135, the ventrals as 175-190 Owing to an error in transcription, 190 has been substituted for 135 at some later date, and this high number faithfully copied by Boulenger, Schmidt and others though unsupported by the literature.

The preocular is rather narrowly separated from the frontal in the three snakes listed above, they also conform to *irregularis* in the counts for both ventrals and subcaudals, on the other hand the Kribi snake at least is very slender anteriorly Both types were collected in Gbanga, Liberia by Dr G M Allen, while in Uganda I have taken series of these snakes from one locality (Mount Debasien) with the preocular in contact *or* separated from the frontal and the temporals either 1 + 1 or 1 + 2. As the preocular character has proved inconstant in other members of the genus it is extremely doubtful whether it is of any value in separating *irregularis* from *heterolepidotus*

Philothamnus semivariegatus semivariegatus Smith.

Philothamnus semivariegatus A Smith, 1849, Ill Zool S Africa, Rept , pls lix, lx, lxiv Bushman's flats and Kurrichane, i e Rustenberg district, Transvaal

♂ ♀ (A N.S P., 20292, 20299). Njiana Farm, B. C. 29-31 viii. 34.

Variation Midbody scale-rows 15, ventrals 187; anal divided; subcaudals 126-135; labials 9, the fourth, fifth and sixth entering the orbit; preocular 1, postoculars 2· temporals 2 + 2.

Measurements ♂ measures 767 (515 + 252) mm., and ♀, 798 (544 + 254) mm

Diet One stomach examined, held a ♀ gecko (***Hemidactylus brookii***).

Gastropyxis smaragdina (Schlegel)

Dendrophis smaragdina Schlegel, 1837, Essai Phys Serp, 2, p 237 Gold Coast

♂ (A N S P, 20710) 30 km e Kribi, C 24 xi 34

Variation Midbody scale-rows 15, ventrals 156, anal divided, subcaudals 148, labials 8, the fourth and fifth entering the orbit, preocular 1; postocular 1, loreal 1; temporals 1 + 2

Measurements Total length 870 (540 + 330) mm

Hapsidophrys lineata Fischer

Hapsidophrys lineatus Fischer, 1856, Abhand Nat Ver Hamburg, 3, p 111, pl ii, fig 5 Elmine, Gold Coast

♀ (A N.S.P, 20337) Saidi's Village, B C 13 ix 34

Variation Midbody scale-rows 15, ventrals 160, anal entire, subcaudals 104, without keels, labials 9, the fifth and sixth entering the orbit, preocular 1, postoculars 2, temporals 2 + 2

Measurements. Total length 702 (455 + 247) mm

Thrasops jacksonii jacksonii Gunther

Thrasops Jacksonii Gunther, 1895, Ann Mag Nat Hist (6), 15, p 528 Kavirondo, Kenya Colony

♂ (A N S P, 20789) Probably Kitala, label detached

Variation Midbody scale-rows 19, ventrals 203, anal divided, subcaudals 143, labials 8, the fourth and fifth entering the orbit; preoculars 2, postoculars 3-4, temporals 1 + 1.

Measurements Total length 1453 (1000 + 453) mm.

Grayia smythii (Leach)

Coluber Smythii Leach, 1818, in Tuckey, Explor River Zaire, App p 409 Boma (Embomma), Belgian Congo

♀ (A N S P, 20786). Kitala, U 14 viii 34
♀ (A N.S P, 20345) Fort Sibut, F E. A 15 x. 34

Variation Midbody scale-rows 17, ventrals 159-164; anal divided, subcaudals 87+ –89; labials 7, the fourth entering the orbit, preocular 1; postoculars 1-2, temporals 2 + 2 or 2 + 3, the lower anterior longer than its distance from the loreal

Measurements The larger ♀ (A N S P., 20786) measures 1365 (1310 + 55) mm

Breeding On August 14, the latter held numerous developing eggs still only about 20 × 10 mm.

Prosymna bocagii Boulenger

Prosymna Bocagii Boulenger, 1897, Ann Mag Nat Hist (6), 19, p 278, fig Zongo, Ubangi Rapids, Belgian Congo

♀ (A N.S P , 20763) Probably Batangafo or 30 km east Kribi Not collected before leaving Nola

Variation Midbody scale-rows 15, ventrals 167, anal entire, subcaudals 17 pairs, labials 6, the third and fourth entering the orbit, preocular 1, the prefrontal also entering the orbit, postoculars 2, temporals 1 + 2.

It differs only from the type in having two subcaudals less, an additional postocular, an additional anterior temporal, and being 43 mm longer in body length, that of the tails being identical

Measurements Total length 383 (355 + 28) mm

Scaphiophis albopunctatus Peters

Scaphiophis albopunctatus Peters, 1870, Monatsb Akad Wiss Berlin, p 645, pl i, f 4 Kita, French West Africa

♀ (A N S P , 20510) Ekibondo's Village, B C 29 ix 34
Yng (A N S P , 20702) 30 km e Kribi, C 19-28 xi 34

Variation Midbody scale-rows 23, ventrals 212-216, anal divided, subcaudals 50-59, labials 5, suboculars 3, preocular 1, postoculars 2, temporals 4 + 5

Measurements The ♀ measures 1195 (1020 + 175) mm

COLUBRIDAE (DASYPELTINAE)

Dasypeltis scaber (Linnaeus)

Coluber scaber Linnaeus, 1758, Syst Nat , ed 10, 1, p 223 Indiis, i e Africa

♂ (A N S P , 20298) Njiana Farm, B C 29-31 viii 34
♀ (A N S P , 20342) Fort Sibut, F E A 14-18 x 34
♀ (A N.S P , 20333) Nola, F E A 27 x 34
♂ ♀ (A N S P , 20664, 20712) 30 km e Kribi, C 24 xi 34

Variation Midbody scale-rows 22-27, ventrals 206-240, anal entire, subcaudals 49-67, labials 7, the third and fourth entering the orbit, preocular 1, except on left side of No 20664 where there are 2, postoculars 2, temporals 2 + 3, 2 + 4, 3 + 6 or 4 + 4, sides of frontal sloping; diameter of eye from ⅙ to ⅕ the length of the head

Coloration The snakes from Njiana Farm and Fort Sibut are of the rhombic type, the Nola specimen is uniform brown (= *palmarum* Leach).

Measurements The larger ♂ (A N S P , 20712) measures 523 (460 + 63) mm., the largest ♀ (A N.S.P , 20664) 898 (763 + 135) mm.

COLUBRIDAE (BOIGINAE)

Boiga pulverulenta (Fischer)

Dipsas pulverulenta Fischer, 1856, Abhand Nat Ver Hamburg, 3, p 81, pl iii, fig 1 Edina, Grand Bassa County, Liberia

♂ ♀ (A N S.P , 20666, 20669) 30 km e Kribi, C 24-29 xi 34
♀ (A.N.S.P., 20751) Probably Kribi, label detached

Variation. Midbody scale-rows 19; ventrals 249-261, anal entire; subcaudals 108-114, labials 8-9, the third, fourth and fifth or fourth, fifth and sixth entering the orbit, preocular 1, except on right side of No. 20751 where there are 2, postoculars 2, loreal 1, temporals 2 + 2.

Measurements The ♂ (A N S.P , 20666) measures 1057 (834 + 223) mm.; the larger ♀ (A.N S P , 20751) 1125 (885 + 240) mm

Boiga blandingii (Hallowell)

Dipsas Blandingii Hallowell, 1844, Proc Acad Nat Sci Philadelphia, p 170 Liberia.

♀ (A N S.P , 20504) Saidi's Village, B C 12-14 ix 34

Variation Midbody scale-rows 23; ventrals 263, anal entire, subcaudals 127, labials 9, the fourth, fifth and sixth entering the orbit; preoculars 2; postoculars 2, temporals 2 + 2.

Measurements Total length 1990 (1540 + 450) mm

Parasites A tick is present on the scales

Crotaphopeltis hotamboeia hotamboeia (Laurenti)

Coronella hotamboeia Laurenti, 1768, Syn Rept, p 85 India orientali, *i e* Africa

♂ ♀ (A N S P , 20147, 20159) Kitala, U 15. viii 34
♂ (A N S P , 20295) Njiana Farm, B C 29-31 viii 34
♀ (A N S P , 20332) Ekibondo's Village, B C. 27. ix 34.
♂ (A N S P , 20726) Nola, F E. A 5 xi. 34.

Variation Midbody scale-rows 19, ventrals 156-176; anal entire, subcaudals 31-44, labials 8, the third, fourth and fifth, or fourth and fifth entering the orbit, preocular 1, well separated from the frontal, postoculars 2; temporals 1 + 2

The Kitala female occupies an intermediate position between *hotamboeia* and the closely related *degeni* (Boulenger) described from Entebbe, nine miles from Kitala Its loreal is a trifle longer than deep, this is not the case with the male, however, which is a typical *hotamboeia*

Coloration. The upper labials of No. 20332 are wholly black

Measurements. The largest ♂ (A N S.P , 20726) measures 296 (257 + 36) mm , the larger ♀ (A N.S.P., 20332) only 167 (90 + 77) mm.

Psammophis sibilans (Linnaeus).

Coluber sibilans Linnaeus (part), 1758, Syst. Nat., ed 10, 1, p 222 Asia (*errore*).

♂ (A.N.S P , 20130). Kitala, U. 15. viii. 34
Yng (A.N.S P., 20150). Njiana Farm, B. C. 29-31. viii. 34.
♂ ♀ (A.N S.P., 20340-1). Fort Sibut, F. E. A. 13. x. 34.

Variation. Midbody scale-rows 17, ventrals 164-175, anal divided, subcaudals 86-102, labials 8, the fourth and fifth entering the orbit; rostral well visible from above, loreal 1¾ times as long as deep, preocular 1; postoculars 2; temporals 2 + 2 or 2 + 3

Coloration The labials of the Fort Sibut snakes are speckled with black, while their ventrals exhibit sharply defined lateral stripes. The two eastern snakes have whitish labials with obsolete dusky spots and their ventrals are only blotched

Measurements The larger ♂ (A N S.P , 20130) measures 856 (630 + 226) mm ; the ♀ (A.N.S P , 20341) 629 (453 + 176) mm

Diet. The Kitala snake had swallowed two shrews, though these are partially digested, Dr G M Allen has been able to identify them as *Crocidura turbo zaodon*

Parasites. Two nematodes (*Kalicephalus* sp) were present in the stomach of this snake

Psammophis punctulatus Duméril & Bibron.

Psammophis punctulatus Duméril & Bibron, 1854, Erpét Gén , 7, p 897 Arabia

♀ ♀ (A N S P., 20211, 20703) Athi River Crossing, K C. 26 vii 34.

Variation Midbody scale-rows 17, ventrals 190-193; anal divided; subcaudals 141+ -160, labials 9, the fifth and sixth entering the orbit, preocular 1, postoculars 2, loreal 1, temporals 2 + 2 or 2 + 3

Measurements The larger ♀ (A.N S P , 20703) measures 1532 (972 + 560) mm.

Breeding The latter is gravid with about 10 eggs measuring approximately 40 × 15 mm.

Thelotornis kirtlandii (Hallowell)

Leptophis Kirtlandii Hallowell, 1844, Proc Acad Nat Sci Philadelphia, p 62 Liberia.

♀ (A N.S.P , 20289). Epulu River Ferry, B C ix 34
♂ (A N S.P , 20506). Saidi's Village, B C 7 ix 34
♂ (A N.S P , 20231) Vube, B C 18 ix 34

Variation Midbody scale-rows 19, ventrals 169-174, anal divided, subcaudals 151-153, labials 8, the fourth and fifth entering the orbit; preocular 1, postoculars 3, temporals 1 + 2

Measurements. The largest, a ♂ (A.N S P , 20231) only measures 1236 (781 + 455) mm

Dispholidus typus (Smith).

Bucephalus typus A. Smith, 1829, Zool Journ , 4, p 441 Old Latakoo, South Africa

♀ ♀ (A N.S.P., 20137-8). Njiana Farm, B C 15 viii. 34.

Variation Midbody scale-rows 19, ventrals 185-186, anal divided; subcaudals 104+ -107, labials 7, the third and fourth entering the orbit; preocular 1; postoculars 3, temporals 1 + 2.

Measurements The larger ♀ (A N.S.P, 20137) measures 1082 (810 + 272) mm, but tip of tail is missing.

Elapops modestus Günther

Elapops modestus Gunther, 1859, Ann Mag Nat Hist (3), 4, p 161, pl iv, fig C West Africa.

♀ (A N S P, 20276). Saidi's Village, B C 13 ix 34.

Variation Midbody scale-rows 15, ventrals 154, anal entire; subcaudals 38, labials 7, the third and fourth entering the orbit, sixth in contact with parietal, preocular 1, postoculars 2; temporals 1 + 3

Coloration A broad, but only faintly distinct, nuchal collar

Measurements Total length 401 (350 + 51) mm

COLUBRIDAE (ELAPINAE)

Elapsoidea güntherii Bocage

Elapsoidea Güntherii Bocage, 1866, Jorn Acad Sci Lisboa, 1, p 70, pl i, figs 3-3b: Cabinda, Portuguese Congo, Bissao, Portuguese Guinea

♀ (A.N.S P, 20346) Fort Sibut, F E A 14-18 x 34

Variation Midbody scale-rows 13; ventrals 153, anal entire; subcaudals ?, labials 7, the third and fourth entering the orbit; preocular 1, postocular 2, temporals 1 + 2

Coloration Above, uniformly black, below, white, each ventral lightly edged with dusky brown It would appear, therefore, to correspond with the color form named *moebius* by Werner (1897, Verh Zool Bot Ges Wien, 47, p 400 Kete, Togoland) which Boulenger (1919, p 294) referred to the synonymy of *guntherii* Time will show whether or not this form may have a geographical distribution warranting its being given subspecific rank. The type of *moebius* was dark brown above, light yellowish below

Measurements Snout to anus 525 mm, tail missing

Naja haje haje (Linnaeus)

Coluber Haje Linnaeus, 1758, Syst Nat, ed 10, 1, p 225 Lower Egypt

1 (A N.S P, 20782) Kasenyi, B C 29 viii 34

Variation Midbody scale-rows 21, ventrals 211; anal entire; subcaudals 60+ tip of tail missing, labials 7, the sixth largest but separated from the orbit, preocular 1, postoculars 3-2, suboculars 2

Naja melanoleuca Hallowell

Naia haie var *melanoleuca* Hallowell, 1857, Proc Acad Nat Sci. Philadelphia, p 61 Gaboon, French Equatorial Africa

♂ (A N.S.P, 20781) Kitala, U. 15 viii 34
♂ (A N S.P., 20746) Saidi's Village, B C. 5. ix. 34

Variation Midbody scale-rows 19, ventrals 209-216; anal entire; subcaudals 64-65; labials 7, the third and fourth entering the orbit.

Measurements The larger ♂ (A.N.S.P., 20781) measures 1895 (1570 + 325) mm

Naja nigricollis nigricollis Reinhardt

Naja nigricollis Reinhardt, 1843, Dansk Vidensk Selsk Skrift, 10, p 269, pl iii, figs 5 & 7 Guinea

♀ (A N S P, 20511) Ekibondo's village, B C 29 ix 34

Variation Midbody scale-rows 25, ventrals 194, anal entire, subcaudals ?, labials 6, the third deepest and entering the orbit, preoculars 2, postoculars 3, temporals 3 + 4 on right, 2 + 3 on left

Coloration Above, black shading to olive on the head, below, throat white, followed by 13 black ventrals, then 7 white, or almost so, rest of undersurface black becoming paler on the tail

Dendraspis jamesoni jamesoni (Traill)

Elaps Jamesoni Traill, 1843, in Schlegel, Essay Phys Serpents (Eng trans), p 179, pl ii, figs 19-20 "South America" [*errore*]

♂ (A N S P, 20757) Possibly Batangofo, or 30 km e of Kribi, C

Variation Midbody scale-rows 19, ventrals 218, anal divided, subcaudals ?, labials 8, the fourth entering the orbit, preoculars 3, postoculars 3, subocular 1

Coloration Tail mottled, each scale having a light centre characteristic of the western form

Dendraspis jamesoni kaimosae Loveridge

Dendraspis jamesoni kaimosae Loveridge, 1936, Proc Biol Soc Washington, 49, p 64 Kaimosi, Kakamega, Kenya Colony

♂ ♀ (A N S P, 20503, 20783) Ekibondo's Village, B C 22-29 ix 34

Variation Midbody scale-rows 17, ventrals 217-224, anal divided, subcaudals 99-109, labials 8, the fourth entering the orbit, preoculars 3, postoculars 3, subocular 1.

The specimen from Ekibondo's, coming as it does from the area of intermediates, has the subcaudal count of the typical form but the caudal coloration of the eastern race

Coloration Tail uniformly black

VIPERIDAE

Causus resimus (Peters)

Heterophis resimus Peters, 1862, Monatsb Akad Wiss Berlin, p 277, pl —, f 4, Gebel Ghule, Senaar, Anglo-Egyptian Sudan

3 (A N S P, 20262, 20752-3). Vube, B C 17-19 ix 34

Variation Midbody scale-rows 19, ventrals 138-145; anal entire, subcaudals 17-18; labials 6-7, excluded from orbit, preoculars 2, postoculars 2; temporals 2 + 3 and 2 + 4

Measurements Larger perfect ♀ (A N.S.P, 20753) measures only 409 (380 + 29) mm

Bitis arietans (Merrem).

Vipera arietans Merrem, 1820, Vers Syst Amphib, p 152: Cape of Good Hope

2 young (A N.S.P, 20300, 20302). Njianà Farm, B. C 29-31. viii 34.

Variation Midbody scale-rows 31, ventrals 136-141; anal entire; subcaudals 18-18, labials 12-14.

Bitis gabonica (Duméril & Bibron)

Echidna Gabonica Duméril & Bibron, 1854, Erpét Gén, 7, p 1428, pl lxxx b Gaboon, French Equatorial Africa

1 (A N S.P., 20180) Kitala, U 17 viii 34
2 (A N.S P., 20773, 20775). Saidi's Village, B C 8-12 ix 34
2 (A N.S.P., 20394, 20776). Ekibondo's Village, B C 22-23 ix 34
2 (A.N.S P., 20741, 20743) One is from Gounguru, F E A 8 xi 34

Variation Midbody scale-rows 35-40, ventrals 128-139, anal entire, subcaudals 20-31, occasionally a few single, labials 12-15

Measurements. The largest, a ♂ (A N S P., 20743) measures 1460 (1300 + 160) mm

Bitis nasicornis (Shaw)

Coluber Nasicornis Shaw, 1802, Nat Miscell, 3, pl xciv Interior of Africa (from the master of a Guinea vessel)

4 ♂♂, 3 ♀♀ (A N.S P, 20507, 20742, 20745, 20749-50, 20777-8) Saidi's Village, B. C 4-10 ix 34

Variation Midbody scale-rows 34-40, ventrals 120-136, anal entire except in No 20777 where it is divided, subcaudals 17-29, labials 15-18

Measurements The largest ♂ (A.N S.P, 20742) measures 900 (820 + 80) mm ; and largest ♀ (A N S.P, 20745) 1040 (960 + 80) mm

Diet. A 418 mm. female held two rodents in its stomach These have been identified by Dr Glover M Allen as *Mastomys coucha* subsp and *Leggada ? minutoides*

Atheris squamigera (Hallowell)

Echis squamigera Hallowell, 1854, Proc Acad Nat Sci Philadelphia, p 193 Near the Gaboon River, French Equatorial Africa

♂ (A N.S P., 20334). Nola, F. E A 27 x 34

Variation Midbody scale-rows 21; ventrals 158; anal entire, subcaudals 60, labials 10, circumocular scales 14, interocular scales 8

Measurements Total length 627 (520 + 107) mm.

Atractaspis irregularis (Reinhardt)

Elaps irregularis Reinhardt, 1843, Dansk Vidensk Selsk Skrift., 10, p 264, pl iii, figs 1-3 Gaboon, French Equatorial Africa.

Young (A N S P, 20294) Njiana Farm, B C 29 viii-2. ix. 34.

Variation Midbody scale-rows 25; ventrals 229, anal divided; subcaudals 26 pairs; labials 5, the third and fourth entering the orbit; preocular 1; postocular 1; temporals 1 + 3.

Measurements Total length 293 (273 + 20) mm.

GEKKONIDAE

Hemidactylus fasciatus Gray

Hemidactylus fasciatus Gray, 1831, Zool Miscell, p 58 No type locality

♂ (A.N S P, 20692) 30 km e Kribi, C 22 xi 34

Variation Upper labials about 10, femoral pores 16-17; enlarged subcaudals about half width of tail

Measurements Total length 126 (68 + 58) mm

Hemidactylus brookii Gray

Hemidactylus brookii Gray, 1844, Zool Erebus & Terror, pl xv, fig 2 Australia and Borneo

♀ (A N S P, 20175) Kasenyi, B C 21 viii 34

Variation Upper labials 7, transverse rows of enlarged, keeled scales across body 16

Measurements Total length 92 (48 + 44) mm

Enemies Geckos of this species were recovered from the stomachs of a house snake (*Boaedon lineatus*) and a spotted wood snake (*Philothamus s semivariegatus*) at Njiana Farm, B C

AGAMIDAE

Agama agama agama (Linnaeus)

Lacerta agama Linnaeus 1758, Syst Nat, ed 10, 1, p 207 "America" [*errore*]
Agama colonorum Daudin, 1930, Hist Nat Rept, 3, p 356 "l'Amerique meridionale", etc

17 (A N S.P, 20798-20813) Probably Kitala, U, but label detached.

3 (A N S P, 20174, 20177, 20179). Kasenyi, B C 21-29 viii. 34

1 (A N S P, 20304) Saidi's Village, B C 3-16 ix 34

25 (A N S P, 20226-30, 20232-3, 20263-9, 20281-8, 20395-6, 20501) Ekibondo's Village, B C. 22-24 ix 34

31 (A N.S P, 20234, 20379, 20406, 20411, 20412-20, 20422-5, 20428-31, 20443, 20446-8, 20482-6, 20491) Fort Sibut, F E A 13-17 x 34

2 (A N.S P, 20399, 20724) Nola, F E A 28 x 34

2 (A N S.P., 20739-40) Berberati, F E A. 4 xi 34

8 (A N S P, 20322-6, 20328-9, 20380) Goungouru, F E A 7-8 xi 34

9 (A.N.S P, 20650, 20652, 20658-60, 20690-1, 20693) 30 km e Kribi, C 22-24 xi 34

22 (A N.S P, 20617-33, 20635, 20637-9) Batangafo, F. E A 7-13. xii 34

Variation For purposes of the following statistics only thirteen lizards were selected from Belgian Congo localities, thirteen from French Equatorial Africa, all from Cameroon

Midbody scale-rows 61-83, average 70 7, it is interesting to observe that both the extremes, 61 (No 20659) and 83 (No. 20690) are females from east of Kribi; preanal pores 8-12, average 11 for forty-six males

Coloration. The throats of the males bear a dark network, rarely wholly black, except in the case of the Fort Sibut series which are immaculate with the exception of No 20486 which is black spotted with white. It may be that two color forms are represented for which one of the many names in the synonymy might be available

Measurements Probably the largest ♂ (A N.S.P , 20809) measures 316 (123 + 193) mm , and largest ♀ (A N S P , 20806) 235 (95 + 140) mm , but the tip of the tail is missing

Agama agama lionotus Boulenger

Agama lionotus Boulenger, 1896, Proc Zool Soc London, p 214, pl viii southeast of Lake Rudolf, Kenya Colony

19 (A N S P , 20168-73, 20195, 20198-204, 20206-10) Athi River Crossing, K C 19-25 vii 34

Variation Midbody scale-rows 74-84, this range holding good for either sex, the series being composed of ten males and nine females, preanal pores 12-16, average 14 for ten males

Coloration The red throat and blue abdomen, characteristic of this race, may still be distinguished

Measurements The largest ♂ (A.N S P , 20168) measures 268 (118 + 150) mm , but the tip of the tail is missing, largest ♀ (A N S P , 20199) measures 224 (86 + 138) mm , two others in the series have the same length from snout to anus but their tails are mutilated

Agama atricollis Smith

Agama atricollis A Smith, 1849, Illus Zool S Africa, Rept , App p 14 Natal, South Africa

14 (A N S P , 20131-6, 20140, 20163, 20165, 20212-6) Kitala, U 15. viii 34

2 (A.N S P , 20149, 20157) Njiana Farm, B C. 1 ix 34

1 (A N.S P , 20704). 30 km e of Kribi, C. 19-28 xi 34

Variation Ventral scales obtusely keeled or almost smooth, males with two or three rows of large preanal pores, the posterior one composed of from 9-11 pores, average 10 for ten males, females with a single row (except for No 20163 where there are two) of from 7-11 small pores, average 9 for seven females

Measurements. The largest ♂ (A N.S P , 20216) only measures 303 (113 + 190) mm.; the largest ♀ (A.N.S.P , 20149) measures 210 (90 + 120) mm but the tip of the tail is missing.

Breeding The latter, taken at Njiana on September 1, is gravid with six eggs measuring 24 × 13 mm.

VARANIDAE

Varanus exanthematicus (Bosc)

Lacerta exanthematica Bosc, 1792, Actes Soc. Hist Nat. Paris, p 25, pl v, fig 3: Senegal

1 (A N S.P , 20714) Batangafo, F E A 7-13 xii 34

Measurements Total length 530 (290 + 240) mm.

Varanus niloticus (Linnaeus)

Lacerta nilotica Linnaeus, 1766, Syst Nat, ed 12, 1, p 369 Egypt

2 (A N S P , 20787-8) S end of Lake Baringo, K C 20 vi 34
1 (A N S P , 20352) Ekibondo's Village, B C 29 ix 34
1 (A N S.P , 20344) Fort Sibut, F E A 14-18 x 34
1 (A N S P , 20790) Label detached

Measurements The largest (A N S P , 20788) measures 980 (390 + 590) mm In view of the frequency with which one hears statements as to the unusualness of encountering young Nile Monitors, it might be stated that one from each of the three localities listed above is very young, that from Fort Sibut measuring 280 (40 + 240) mm

LACERTIDAE

Algiroides africanus Boulenger

Algiroides africanus Boulenger, 1906, Proc Zool Soc London, 2, p 570, fig 96, Entebbe, Uganda

1 (A N S P , 20270) Saidi's Village, B C 9 ix 34

Variation Midbody scale-rows 22, lamellar scales beneath fourth toe 17, femoral pores 16-17, the adpressed hind limb only reaches as far as the shoulder

Eremias nitida quadrinasalis Chabanaud

Eremias quadrinasalis Chabanaud, 1918, Bull Mus Hist Nat Paris, 24, p 108 Shari-Chad district, French Equatorial Africa
Eremias nitida garambensis Schmidt, 1919, Bull Amer Mus Nat Hist, 39, p 511, figs 18–19 Garamba, Uele district, Belgian Congo

2 (A N S P , 20636, 20649) Batangafo, F E A 7-13 xii 34

Synonymy It seems probable that Schmidt's description of *garambensis* had been written before the appearance of Chabanaud's *quadrinasalis*, though the latter antedates it by nine months

The importance of the four nasal plates on the right side of the head in the single known example of *quadrinasalis*, are largely nullified by its having only 3, one of which is semidivided, on the left, as well as the erratic division of head plates to which the species is subject as shown by Schmidt's careful analysis of variation in his type series of thirty-four lizards.

The two specimens listed above, are from a locality—Batangafo—, which is at most only some 200 miles southeast of the vague type locality of *quadrinasalis* a species with which they appear to agree in all essentials

I have compared them with a paratype (M C Z 13354) of *garambensis* with which they agree in color pattern as in morphological characters except that one having 69 dorsals exceeds by 5 any of Schmidt's thirty-four Congo *garambensis*

Boulenger (1921, p 227) by lumping *garambensis* with *nitida* in his key, has masked the true position which may be expressed thus·

4 known *nitida* from Nigeria have 42-51 dorsals across midbody
3 " *quadrinasalis* from F E A 62-69 " " "
34 " *garambensis* from B C 62-64 " " "

The number of lamellae under the fourth toe is 21-24, 24-26 and 22 for our paratype of *garambensis*, no range given in the description I feel justified, therefore, in regarding *garambensis* as a synonym of the unfortunately named *quadrinasalis*

Variation Longitudinal dorsal scale-rows 62-69, transverse ventral scale-rows 6, femoral pores 14-15, subdigital lamellae on fourth toe 24-26

Measurements ♂ (A N S P, 20636) measures 205 (63 + 142) mm

SCINCIDAE

Mabuya maculilabris (Gray)

Euprepis maculilabris Gray, 1845, Cat Lizards Brit Mus, p 114 West Africa

1 (A.N S P, 20293) Njiana Farm, B. C. 29 viii-2 ix 34
3 (A N S P, 20259, 20719, 20722) Vube, B C 17-18 ix 34
4 (A N S P, 20217, 20219-21) Ekibondo's Village, B. C 22 ix 34
14 (A N.S P, 20236-7, 20245, 20401-5, 20407, 20432-5, 20444) Fort Sibut, F E A 13-17 x 34
1 (A N S P, 20400) Nola, F E A 28 x 34
3 (A N S P, 20327, 20392-3). Gounguru, F E A 7-8 xi 34
4 (A N S P, 20733-4, 20736, 20738) Berberati, F. E. A 14 xi 34
4 (A N S.P, 20662, 20695-6, 20698) 30 km e Kribi, C 24-28 xi 34
1 (A N S P, 20762) Probably Kribi, label detached

Variation Midbody scale-rows 30-34, average 32, scales with 3-9 keels, 3 in Nos 20237 and 20432 which I am satisfied are *maculilabris* and not *blandingii* Hallowell, 1844, of which *raddoni* Gray, 1845, is a synonym, supranasals in contact in twenty-one, separated in twelve, prefrontals in contact in thirteen, separated in twenty-two, they are separated in only four of the Sibut series, supraoculars 4, supraciliaries 5-7, frontoparietals and interparietal distinct except in No 20293 where they are fused, this skink is also unique in exhibiting a forked tail of which the original and reproduced portion are of equal length, *viz* 45 mm, ear lobules frequently indistinct ranging from 0-5

Measurements The largest ♂ (A N S.P, 20722) measures 193 (80 + 113) mm, and ♀ (A.N S P, 20393) 210 (70 + 140) mm

Breeding On November 7-8, this large female held small developing ova, while on September 22, 1934 another (A N.S P., 20217) held 8 spherical eggs, 7 5 mm in diameter

Diet Grasshoppers, ants and termites.

Parasites Indeterminate, because female, oxyurids were present in a skink from Ekibondo's Village

Mabuya perrotetii (Duméril & Bibron)

Euprepes Perrotetii Duméril & Bibron, 1839, Erpet Gén, 5, p 699 Senegal

4 (A N S P, 20359, 20427, 20437, 20492) Fort Sibut, F E A 13-18. x 34.
2 (A N S.P, 20759, 20761) Goungouru, F E A 8 xi 34
3 (A N S P, 20735, 20759, 20761) Berberati, F E A 14 xi 34
2 (A N S P, 20640, 20642) Batangafo, F E A. 7-13 xii 34
1 (A N S.P, 20661) 30 km e of Kribi, C 24-29 xi 34

Variation Midbody scale-rows 32-34, supraciliaries 6-7, usually 6, first supraocular in contact with, or separated from, the frontal

Coloration The flanks of these skinks still retain a very delicate shade of mauve pink

Measurements The largest (A N S P, 20359) measures 292 (140 + 152) mm, a sexed ♀ (A N S P, 20642) 280 (120 + 160) mm

Breeding Four gravid females (Nos 20640, 20642, 20759, 20761) held the following (1) 24 eggs measuring 12 × 7 mm, (2) 24 eggs measuring 13 × 8 mm., (3) 20 eggs measuring 13 × 8 mm, (4) 16 eggs measuring 13 × 8 mm respectively

Diet Stomachs examined, held (1) hawkmoth caterpillar, large grasshopper, (2) caterpillar, woodlouse, (3) three caterpillars, termites, and a spider

Mabuya quinquetaeniata obsti Werner

Mabuya obsti Werner, 1913, Mitt Nat Mus Hamburg, 30, p 43 Kwa Mtoro, Central Province, Tanganyika Territory
Mabuya quinquetaeniata hildebrandtii Sternfeld (not of Peters), 1917, Wiss Ergebn Zweiten Deutsch Zent-Afrika-Exped 1910-1911, 1, p 438, pl xxiv, fig 3 Teita, Kenya Colony

4 ♀♀ (A N S P, 20194, 20196-7, 20205) Athi River Crossing, K C 19-25 vii 34

Variation Midbody scale-rows 43-44, supralabials anterior to subocular 4, supraciliaries 5-7 Sexing of these skinks, as well as those of the following race, is by color pattern only and has not been checked by dissection

This series from near Kibwezi comes from the great area of intermediates between typical *quinquetaeniata* of Egypt with 35-42 midbody scale-rows, and *q margaritifer* of Mozambique with 42-44 For lengthy discussion see my remarks (1929, pp 71-73 and 1936, p. 315)

Mabuya quinquetaeniata scharica Sternfeld

Mabuia quinquetaeniata scharica Sternfeld, 1917, Wiss Ergebn Zweiten Deutsch Zent.-Afrika-Exped 1910-1911, 1, p 436, pl xxii, figs 1-4, pl xxiv, figs 4, 7, 8. Shari River and Upper Ubangi, French Equatorial Africa

4 ♂♂, 3 ♀♀ (A N S P, 20349-51, 20373-4, 20376, 20502) Ekibondo's Village, B C 22-29 ix 34

10 ♂♂, 5 ♀♀ (A.N S P, 20235, 20238, 20408, 20421, 20426, 20440-2, 20449, 20452, 20487-90) Fort Sibut, F E A 12-20 x 34.

4 ♂♂, 2 ♀♀ (A.N S P, 20641, 20643-7) Batangafo, F E A. 7-13. xii 34

Variation Midbody scale-rows 34-40, average 36, labials anterior to the subocular 4, except in three specimens where there are 5 on one side only, supraciliaries 5-7, average 5 8

The recognition of this race appears justifiable on the grounds that the throat of the males is usually uniformly jet black, young males may show flecks or spots like those of the typical race *M q scharica* probably averages larger than the typical race

Measurements The largest ♂ (A N S.P, 20452) measures 263 (108 + 155) mm., and ♀ (A.N S.P., 20376) 235 (100 + 135) mm

Breeding One female (No 20350) examined is gravid, the ten spherical ova measuring about 9 mm in diameter

Diet Stomach examined held a large hairy caterpillar, chrysomelid beetle, Orthoptera, termites

Mabuya varia varia (Peters)

Euprepes (Euprepis) varius Peters, 1867, Monatsb Akad Wiss Berlin, p 20 Tete, Mozambique

2 (A N S P, 20728-9) Near Kijabe at 8,200 feet, K C 30 vi 34
1 (A N S P, 20730) W Mt Kenya at 7,800 feet, K C 9 vii 34

Coloration One of the Kijabe skinks (No 20729) is almost uniformly brown, anteriorly there is a faint indication of the light dorso-lateral streaks, but both the lateral and vertebral lines are absent

Measurements The largest (A N S P, 20728) measures only 147 (57 + 90) mm

Mabuya striata (Peters)

Tropidolepisma striatum Peters, 1844, Monatsber Akad Wiss Berlin, p 36 Mosambique

3 (A N S P, 20160-1, 20706) Kitala, U 8-15 viii 34
7 (A N S P, 20152-8) Njiana Farm, B C 29-31 viii 34

Variation Frontal in contact with frontonasal, the latter being longitudinally divided in No 20154 only

Riopa fernandi (Burton)

Tiliqua fernandi Burton, 1836, Proc Zool Soc London, p 62 Fernando Po

1 (A N S P, 20378) Ekibondo's Village, B. C. 29 ix 34
1 (A N S P, 20737) Berberati, F E A 14 xi 34

Variation. Midbody scale-rows 35-38; upper labials 7, the fifth and sixth entering the orbit, supraoculars 5

Measurements The larger (A N.S.P., 20378) measures 270 (125 + 145) mm

Diet Stomachs examined held (1) large slug, mass of termites; (2) a small and two large slugs, snail, polydesmid, harvestman spider, black cricket

Parasites A nematode was present in one stomach

Riopa sundevallii (Smith)

Eumeces (Riopa) sundevallii A Smith, 1849, Illus Zool S Africa, Rept, App p 11 Natal, South Africa

♀ (A N S P., 20410) Fort Sibut, F E A 13-16 x 34
♀ (A N S P, 20648) Batangafo, F E A 7-13 xii 34

Variation In the Batangafo skink the frontal is slightly shorter than the frontoparietals and parietals together and the right parietal is bordered only by small scales (*sundevallii*) but the left parietal is bordered by a pair of enlarged nuchals (*guineense*)

Measurements The larger ♀ (A N S P, 20648) measures 158 (82 + 76) mm

Breeding While the ova are only slightly enlarged in the Fort Sibut skink, they are well-developed in the specimen from Batangafo

ANELYTROPIDAE

Feylinia currori elegans (Hallowell)

Acontias elegans Hallowell, 1852, Proc Acad Nat Sci Philadelphia, p 64 Liberia

1 (A N S P, 20765) Probably Kitala, U, label detached

Variation Midbody scale-rows 23, ocular in contact with second labial but separated from the third by the postocular as is characteristic of this race

Coloration Uniformly black

Measurements Total length 205 (200 + 5) mm

CHAMAELEONTIDAE

Chamaeleo senegalensis Daudin

Chamaeleo senegalensis Daudin 1802 Hist Nat Rept, 4, p 203 Region watered by the Senegal and Niger Rivers, Gambia and Guinea
Chamaeleon laevigatus Gray, 1863, Proc Zool Soc London, p 95 500 miles south of Khartoum, Anglo-Egyptian Sudan

5 ♂, 4 ♀, 4 young (A N S P, 20239-41, 20243 20354, 20360, 20364-5, 20371-2, 20409, 20445) Fort Sibut, F E A 16-18 x 34
♀ (A.N S P, 20656) 30 km e of Kribi, C 22-28 xi 34

Variation Before ascertaining the localities from which these came, I endeavoured to sort them according to the key proposed by Werner (1902, p 319) for separating *senegalensis* from *laevigatus* With difficulty they fell into two series after which it was found that these both occurred in the same locality! Next they were compared with Kenya material as representative of the eastern *laevigatus* and many found to be inseparable I conclude, therefore that the alleged differences are conditional and not geographic I consider that in well-nourished chameleons the fatty deposits on the nape tend to give prominence to the casque (*senegalensis*), while in emaciated specimens it subsides more into line with the dorsal crest (*laevigatus*). Actual topotypic examples of *senegalensis* appear to be scarce in collections and have not been available for comparison

Measurements The largest perfect ♂ (A N S P) measures 192 (97 + 95) mm , largest ♀ ♀ (A N S P , 20371) 200 (115 + 85) mm.

Breeding All the four adult females from Fort Sibut, ranging from 100 to 115 mm in length from snout to anus, are gravid One examined in detail held 45 eggs, each measuring 13 × 7 mm in alcohol

Enemies. It is interesting to observe that the largest female does not appear to have been much handicapped by the loss of her left hind leg at the knee, the injury being of long standing and completely healed

Chamaeleo gracilis gracilis Hallowell

Chamaeleo gracilis Hallowell, 1842, Journ Acad Nat Sci Philadelphia, p 342, pl xviii. Monrovia, Liberia

Young (A N S P., 20173) Kasenyi, B C 28 viii 34

♂, ♀ (A N S P , 20330-1) Vube, B C 18 ix 34

1 ♂, 2 ♀ ♀ (A N S P , 20375, 20377, 20451) Ekibondo's, B C 29 ix-3 x 34

4 ♂ ♂, 11 ♀ ♀ (A N S P , 20353, 20355, 20357-8, 20361-3, 20366-70, 20438-50) Fort Sibut, F E A 16-18 x 34

6 ♀ ♀ (A N S P , 20611-6) Batangafo, F E A 7-13 xii 34

4 ♀ ♀ (A N S P , 20651, 20653-4, 20657) 30 km e of Kribi, C 24-29 xi 34

Variation The six males possess well-developed tarsal spurs which distinguishes the typical form from *C g etiennei* Schmidt of the lower Congo region

Measurements The largest ♂ (A N S P , 20375) measures 268 (141 + 127) mm , the largest ♀ (A N S.P , 20614) 380 (195 + 185) mm

Breeding The largest female in the Kribi series, measuring 245 mm., is bloated with spherical eggs measuring 11 mm in diameter, the others from this locality are not so.

Chamaeleo bitaeniatus bitaeniatus Fischer

Chamaeleo bitaeniatus Fischer, 1884, Jahrb Hamburg Wiss Anst , 1, p 23, pl ii, figs 7 a-b Lake Naivasha, Kenya Colony

♂ (A N S P , 20705) Nanyuki, K C 14 vii 34

Enemies The tail of this specimen is truncated from a point 8 mm. posterior to the anus, the stump has long since healed It was taken "in grass on ground toward evening"

Chamaeleo bitaeniatus höhnelii Steindachner

Chamaeleon hohnelii Steindachner, 1891, Sitzber Akad Wiss Wien, 100, part 1, p. 309, pl 1, fig 2 Laikipia, Kenya Colony

♂ (A N S P, 20181) Nanyuki, K C 14 vii 34

Measurements Total length 215 (105 + 110) mm

Chamaeleo cristatus Stutchbury

Chamaeleo cristatus Stutchbury, 1837, Trans Linn Soc, 17, p 361 Gaboon, i e. French Congo

♂ (A N S P, 20655) 30 km e of Kribi, C 24-29 xi 34

Measurements Total length 186 (100 + 86) mm

PIPIDAE

Xenopus mülleri (Peters)

Dactylethra mulleri Peters, 1844, Monatsb Akad Wiss Berlin, p 37 Mozambique.

1 (A N S P, 20667) Batangafo, F E A 7-13 xii 34

Distribution Formerly believed to be confined to East Africa, Muller's Smooth Clawed Frog has already been recorded from the west by Sternfeld (1917, p 507)

Variation Though the naked metatarsal tubercle seems to be better developed in the western frogs, it can be matched by individuals from Tanganyika Territory

Measurements Length from snout to anus 53 mm

Xenopus fraseri Boulenger

Xenopus fraseri Boulenger, 1905, Proc Zool Soc London, 2, p 250 West Africa

2 (A N S P, 20721, 20723) Nola, F E A 30 x 34

Variation Parker (1936, p 156) has reinstated this species, synonymized with *tropicalis* by Noble (1924, p 160), recognizable by its smooth snout and chin, well-developed lower eyelid, etc

Measurements The larger frog (A N S P, 20721) measures 46 mm

Xenopus tropicalis (Gray)

Silurana tropicalis Gray, 1864, Ann Mag Nat Hist (3), 14, p 315 Lagos Nigeria

1 (A N S P, 20720) Vube, B C 18 ix 34

Variation Differs from the preceding species by the presence of blister-like pustules on snout and chin, a rudimentary lower eyelid, etc

Measurements 43 mm

BUFONIDAE

Bufo superciliaris Boulenger

Bufo superciliaris Boulenger, 1887, Proc Zool Soc London, p 565 Rio del Rey, Cameroon

♀ (A N S P., 20303). Saidi's Village, B C 14 ix. 34
♀ (A N.S P, 20468). Ekibondo's, B C 29-30. ix. 34

Measurements. The larger (A N.S P., 20468) measures 133 mm

Breeding The ova are small in both specimens

Bufo regularis regularis Reuss.

Bufo regularis Reuss, 1834, Mus. Senckenberg, 1, p. 60. Egypt.

2 ♂, 5 ♀, 3 yng (A.N.S.P., 20141-3, 20146, 20162, 20167, 20184, 20186-7, 20192). Kitala, U. 8-15. viii. 34.
♀ (A.N.S.P., 20176). Kasenyi, B. C. 21. viii. 34.
1 yng (A.N.S.P., 20139). Njiana, B. C. 29. viii. 34.
5 ♀ (A.N.S.P., 20224, 20260-1, 20716-7). Vube, B. C. 17-19. ix. 34.
2 ♂, 2 ♀ (A.N.S.P., 20278-80, 20307). Ekibondo's, B. C. 22. ix. 34.
4 ♀ (A.N.S.P., 20475-8). Fort Sibut, F. E. A. 16-17. x. 34.
4 ♂, 5 ♀ (A.N.S.P., 20669-77). Batangafo, F. E. A. 7-13. xii. 34.
5 ♂, 6 ♀ (A.N.S.P., 20247-9, 20479, 20493-9). Nola, F. E. A. 27. x. & 2. xi. 34.

Measurements. The largest ♂ (A.N.S.P., 20143) measures 82 mm., the largest ♀ ♀ (A.N.S.P., 20141, 20248) 90 mm.

Bufo regularis subsp. ?

25 (A.N.S.P., 20308-21, 20381-91). Gounguru, F. E. A. 6-9. xi. 34.

Variation. These toads do not appear to be wholly typical; they appear to differ in the more pronounced development of a line of tubercles on the posterior side of the fore arm and in a conspicuous lateral line of tubercles. These characters are, however, somewhat accentuated by the dessication of the material. They appear to be smaller in size, yellowish below and deserticolorous above while many exhibit a trace of pink on the flanks, inner fore arm, hinder part of tibia and outer edge of foot.

If they should be worthy of subspecific recognition, it seems possible that one of the four names proposed by Rochbrune (1884, pp. 12-18) would be available.

Measurements. No specimens have nuptial asperities. The largest ♀, which is non breeding, (A.N.S.P., 20308) measures 61 mm.

Parasites. Indeterminate ♀ ♀ oxyurids present in one of the series.

Bufo camerunensis camerunensis Parker.

Bufo camerunensis camerunensis Parker, 1936, Proc. Zool. Soc. London, 1, p. 153. Oban, Calabar, Nigeria.

♀ (A.N.S.P., 20689). 30 km. e. of Kribi, C. 22. xii. 34.

Affinities. Compared with a paratype in the Museum of Comparative Zoölogy. This is the common spinose-flanked toad which has long been known as *polycerus* Werner, but which Parker states is distinct from that species which is a synonym of *tuberosus* Gunther.

Measurements. 70 mm.

Bufo funereus Bocage.

Bufo funereus Bocage, 1866, Jorn. Sci. Lisboa, 1, p. 77. Duque de Bragança, Angola.

4 ♀ (A.N.S.P., 20225, 20250, 20252, 20273). Saidi's, B. C. 9-14. ix. 34.
3 ♀ (A.N.S.P., 20277, 20291, 20306). Ekibondo's, B. C. 22. ix. 34.

Measurements The largest ♀ (A N S.P , 20225) measures 66 mm , the rest of the series are but slightly smaller

Bufo vittatus Boulenger

Bufo vittatus Boulenger, 1906, Proc Zool Soc London, p 573, fig 98 Entebbe, Uganda

♀ (A N S P , 20191) Kitala, U 7-17 viii 34

Distribution Through the courtesy of Dr Carl, I have been able to examine the Biharamulo toad referred to *taitanus* Peters by Dr Roux (1910, p 103) The specimen is a *vittatus* as I suspected, doubtless the Jinja toad, recorded in the same paper, is also a *vittatus* In that event, the Kitala toad is the fifth known Uganda example of this rare species Kitala is but nine miles from the type locality

If the Egyptian toads are conspecific, however, Flower (1933, p 842) quotes Nicoll as saying that it swarms near Simbellawin, Daqahlia Province, Lower Egypt It has also been recorded from Ramleh, Alexandria

Measurements 33 mm

Breeding The ova are developing

Diet The stomach is distended with small beetles of many species.

POLYPEDATIDAE

Leptopelis aubryi (Dumeril)

Hyla aubryi A Dumeril, 1856, Rev Mag Zool (2), 8, p 561 Gaboon

1 (A N S P , 20718) Nola, F E A 27 x 34

Measurements 45 mm

Megalixalus sp

♀ (A N S P , 20725) Nola, F E A 27 x 34

Affinities The Museum of Comparative Zoology having no material of *M immaculatus* Boulenger of Spanish Guinea or of *lindholmi* Andersson of Cameroon, I submitted this frog to Mr H W Parker who has kindly compared it with the type of *immaculatus* He writes "I find that your specimen is very different It is longer headed with a more prominent and narrower snout *M immaculatus* is definitely a broad-headed species as figured by Boulenger, but the figure is not quite accurate with regard to the digital webbing Actually the type, and six others which I have examined, have more than is shown, but slightly less than in Anderson's figure of *lindholmi* Your 20725 has the outer fingers half-webbed, the tubercles on the two outer fingers double; the distal tubercle of the fourth toe double, and the tibio-tarsal articulation (of the adpressed hind limb) reaching the anterior border of the eye "

Coloration. Above, violet brown with scattered fine black spots only noticeable with a lens, in the centre of the back a light-edged brown blotch of irregular outline, a dark brown band, light-edged above, from snout along flanks, its lower edge undulating, exposed parts of limbs light brown punctate with black like the dorsum Below, pure white.

Measurements 36 mm.

Hyperolius pleurotaenius (Boulenger)

Rappia pleurotaenia Boulenger, 1906, Ann Mag Nat Hist (7), 17, p 322 Zima, Cameroon and Benito River, French Congo

♀ (A N.S.P , 20453) Ekibondo's, B C 3 x 34

Affinities This frog has been compared with some of the Lang-Chapin series from Medje, Belgian Congo, identified by Noble (1924, p 258) as *pleurotaenius* and is unquestionably conspecific No topotypic examples are available for comparison This female is normal in exhibiting the light lateral band which is edged with darker both above and below

Measurements 24 mm

Hyperolius concolor (Hallowell)

Ixalus concolor Hallowell, 1844, Proc Acad Nat Sci Philadelphia, 2, p 60 Liberia.

♂ (A N S.P , 20474) Ekibondo's, B C 1 x 34

Affinities Undoubtedly conspecific with the Congo frogs referred to *concolor* by Noble (1924, p 254) with some of whose series it has been compared On the other hand, it does not match topotypic Liberian examples (M C Z 11945, 12021-2) so closely

Measurements 32 mm

Hyperolius rossii (Calabresi).

Rappia rossii Calabresi, 1925, Atti Soc Ital Sci Nat Milano, 64, p 121, fig Upper Uele region region, Belgian Congo

♀ (A N S P , 20166) Kitala, U 8-15 viii. 34

Coloration Above, uniformly grayish white thickly flecked with darker. Below, creamy white sparsely spotted with orange on breast and belly These spots are characteristic of the species

Measurements 28 mm

Hyperolius ? schubotzi Ahl.

Hyperolius schubotzi Ahl, 1931, Mitt Zool Mus Berlin, 17, p 63 Kisenji, Lake Kivu, Belgian Ruanda-Urundi

♀ (A N S P , 20731) Kasenyi, B C 25 viii 34

Affinities This frog is apparently closely related to *striolatus* Peters, but on geographical grounds one might expect them to be distinct I have compared it with a topotype of *stuhlmanni* Ahl from the south end of Lake Edward which is in the same group. Without a series it is almost impossible to know the exact status. Lake Edward lies between Kisenji, Lake Kivu and Kasenyi, Lake Albert, but *schubotzi* has page precedence over *stuhlmanni* should they prove to be the same.

Coloration Above, grayish white thickly peppered with dusky spots each of which is composed of fine black specks Below, uniformly white.

Measurements 25 mm

Hyperolius nasutus Gunther

Hyperolius nasutus Gunther, 1864, Proc Zool Soc London, p 482, pl xxxiii, fig 3 Duque de Bragança, Angola

♀ (A N S P , 20732) Kitala, U 8 viii 34

Measurements 22 mm

RANIDAE

Astylosternus diadematus Werner

Astylosternus diadematus Werner, 1898, Verh Zool-Bot Ges Wien, 48, p 200, figs Victoria, Cameroon

3 (A N S P , 20683-5) 30 km e of Kribi, C 22 xi 34

Measurements The largest (A N S P , 20683) measures 52 mm

Rana goliath Boulenger

Rana goliath Boulenger, 1906, Ann Mag Nat Hist (7), 17, p 317 Efulen, Cameroon

♀ (A N S P , 20772) 30 km e of Kribi, C 22 xi 34

Measurements 220 mm

Rana crassipes Buchholz & Peters

Rana crassipes Buchholz & Peters, 1875, Monatsb Akad Wiss Berlin, p 201 Abo, Cameroon

1 ♂, 4 ♀ (A N S P , 20680-2, 20686, 20688) 30 km e of Kribi, C 22 xi 34

Measurements The ♂ (A N S P , 20680) measures 64 mm , the largest ♀ (A N S P , 20681) 63 mm

Rana occipitalis Gunther

Rana occipitalis Gunther, 1858, Cat Batr Sal Brit Mus , p 130, pl xi "Africa, West Africa, Gambia"

♀ ♀ (A N S P , 20480-1) Fort Sibut, F E A 16-17 x 34
Juv (A N S P , 20678) Batangafo, F E A 7-13 xii 34

Measurements The larger ♀ (A N S P , 20480) measures 141 mm

Breeding Both females carry much ova

Rana ornata (Peters)

Pyxicephalus ornatus Peters, 1878, Monatsb Akad Wiss Berlin, p 207, pl ii, f 7 Teita, Kenya Colony.

♀ (A.N.S P , 20668) Batangafo, F E A 7-13 xii 34

Measurements 58 mm

Rana fuscigula chapini Noble

Rana chapini Noble, 1924, Bull Am Mus Nat Hist , 49, p 214, f 6a Batama, Belgian Congo

♀ (A.N.S.P., 20255). Saidi's Village, B. C. 11-14. ix. 34.

Measurements. 60 mm.

Diet. The stomach contents consisted of numerous millipedes, curculionid beetles, head of a bee, and some ants which the late Dr. W. M. Wheeler has identified as *Odontomachus assiniensis* Emery var. *furvior* Wheeler.

Rana oxyrhynchus oxyrhynchus Smith

Rana oxyrhynchus A. Smith, 1849, Illus. Zool. S. Africa, Rept., pl. lxxvii, fig. 2, 2a–2c. Kafirland and region of Port Natal.

♀ (A.N.S.P., 20151). Njiana Farm, B. C. 29-31. viii. 34.

Measurements. 58 mm.

Rana mascareniensis venusta Werner

Rana venusta Werner, 1907, Sitz. Akad. Wiss. Wien, 116, part 1, pp. 1889 and 1892, pl. iv, f. 11. Entebbe, Uganda; Mongalla and Lagos.

1 ♂ 3 ♀ (A.N.S.P., 20144, 20189, 20190, 20193). Kitala, U. 8-15. viii. 34.

♀ (A.N.S.P., 20271). Saidi's Village, B. C. 9-10. ix. 34.

Measurements. All are small, the largest ♀ (A.N.S.P., 20271) being only 52 mm.

Rana galamensis galamensis Duméril & Bibron

Rana galamensis Duméril & Bibron, 1841, Erpét. Gen., 8, p. 367. Galam Lakes, Senegal.

4 ♀ (A.N.S.P., 20145, 20164, 20185, 20188). Kitala, U. 15. viii. 34.
♀ (A.N.S.P., 20242). Fort Sibut, F. E. A. 16. x. 34.

Variation. Three joints of the fourth toe are free of web while on *R. g. bravana* from the East Coast it is nearer two joints.

Coloration. The thighs, with one exception, are spotted rather than streaked.

Measurements. The largest ♀ (A.N.S.P., 20164) measures 68 mm.

Rana albolabris Hallowell

Rana albolabris Hallowell, 1856, Proc. Acad. Nat. Sci. Philadelphia, 8, p. 153: West Africa.

5 ♂, 2 ♀ (A.N.S.P., 20251, 20253-4, 20256-8, 20272). Saidi's Village, B. C. 11-14. ix. 34.

2 ♂ (A.N.S.P., 20222-3). Vube, B. C. 19. ix. 34.

3 ♂ 16 ♀ (A.N.S.P., 20218, 20305, 20453, 20456-65, 20467, 20469-73). Ekibondo's, B. C. 22. ix-1. x. 34.

2 ♂, 5 ♀ (A.N.S.P., 20687, 20791-6). 30 km. e. Kribi, C. 22. xi. 34.

Measurements. The largest ♂ (A.N.S.P., 20471) measures 65 mm., the ♀ (A.N.S.P., 20472) 75 mm. This exceeds by 2 mm. the maximum given by Noble (1924, p. 217) for his large series from the Belgian Congo.

Arthroleptis poecilonotus Peters

Arthroleptis poecilonotus Peters, 1863, Monatsb Akad Wiss Berlin, p 446 Boutry, Ashanti, Gold Coast

1 (A N.S P., 20727) 30 km e Kribi, C 19-28 xi 34

Measurements 22 mm

Phrynobatrachus ? acutirostris Nieden

Phrynobatrachus acutirostris Nieden, 1912, Wiss Ergeb Deut -Zentral-Afrika Exp 1907–08, 4, p 173, figs 1a–c Rugege Forest, Belgian Ruanda-Urundi

♂ (A N S.P , 20466) Ekibondo's Village, B C 29-30 ix 34

Affinities This frog is in such poor condition, flattened and rubbed, that it is not possible for me to assign it to any species with any degree of certainty. It appears to be very close to *acutirostris* but lacks the definite demarcation between dorsal and lateral coloring as described for that species It lacks the striking light band of *albotaeniata* Witte, being uniform brownish above, mottled on sides, throat black

Its toes are webbed almost to the tips with the exception of the fourth which has the terminal joint free, tips of toes dilated into disks, the tibiotarsal articulation of the adpressed hind limb reaches to the nostril or to the end of the snout, snout about one and a half times the length of the orbital diameter

Measurements 32 mm The length of the ♀ type of *acutirostris* was 46 mm , females being larger than males in this genus

Hemisus marmoratum guineensis Cope

Hemisus guineensis Cope, 1865, Nat Hist Review, p 100, footnote, presumably Guinea (Type in the Vienna Museum)

? ♂ (A N S P , 20244) Fort Sibut, F E A 17 x 34

Measurements This example of the large, spotted, western form, measures 41 mm

BIBLIOGRAPHY

BOULENGER, G A

1894 Catalogue of Snakes in the British Museum (Natural History) London, 2, pp, i–xi and 1–382, figs 1–25, pls i–xx

1915 A List of the Snakes of the Belgian and Portuguese Congo, Northern Rhodesia, and Angola Proc Zool Soc London, pp 193–223, figs 1–2

1919 A List of the Snakes of West Africa, from Mauritania to the French Congo Proc Zool Soc London, pp 267–298, figs 1–2

1921 Monograph of the Lacertidae London, 2, pp i–viii and 1–451

FLOWER, S S

1933. Notes on the recent Reptiles and Amphibians of Egypt, with a list of the Species recorded from that Kingdom Proc Zool Soc London, pp 735–851, map

LOVERIDGE, A
1929. East African Reptiles and Amphibians in the United States National Museum Bull U S Nat. Mus, No 151, pp 1–135, pl i
1936 "Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa V Reptiles" Bull Mus Comp Zool, 79, pp 209–337, pls i–ix.

NOBLE, G. K.
1924 Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition, 1909–1915 Part III Amphibia Bull Am Mus Nat Hist, 49, pp 147–347, figs 1–8, pls xxiii–xlii

PARKER, H W
1936 The Amphibians of the Mamfe Division, Cameroons I Zoogeography and Systematics Proc Zool Soc London, pp 135–163, figs 1–8, pl i

ROCHEBRUNE, A T DE.
1884 Faune de la Sénégambie Reptiles Paris, pp 1–221, pls i–xx

ROUX, J
1910 Reise von Dr J Carl im Nordlichen Zentral-Afrikanischen Seengebiet Reptilien und Amphibien Revue Suisse Zool, 18, pp 95–103

STERNFELD, R
1917 Reptilia und Amphibia, in Wiss Ergeb der Zweiten Deutschen Zentral-Afrika-Expedition 1910–1911, Leipzig, 1, pp 407–510, pls xxii–xxiv

NOTES ON FISHES FROM THE GULF STREAM AND THE NEW JERSEY COAST

BY HENRY W. FOWLER

During the past year and season the Academy has been the fortunate recipient of rare and interesting new fishes from off New Jersey As many establish important records in distribution, or are additions to the fauna of the region, they are reported in the present paper One species believed to be new is described and figured Several little-known or rare forms are also noted in detail or figured

The off-shore specimens were obtained about 70 miles southeast of Cape May, and brought in by the trawlers of the Atlantic Coast Fisheries Corporation of New York, with their catches of commercial fishes during the winter of 1936–1937 Acknowledgment is extended to this organization, as well as to the various officers of the boats who permitted us to secure the materials for our museum Mr Fred McAdams reserved a number of specimens, and Mr Otway H Brown located others, and kindly forwarded them from Cape May I visited Cape May February 27 (1), March 6 (2), March 13 (3), and examined numerous catches The numbers in parentheses indicate the various localities, and follow with the listed species below. Mr Stewart Springer also sent me several specimens from the same region brought into Norfolk, Va (4)

Of the shore fishes, materials were received from Young's Pier at Atlantic City, April 1936, obtained by R Dale Benson, Jr (5), Brigantine in June (6) and Atlantic City in October (7) by Gordon Hill, various localities by W E Deets Charles Hied reported and sent a number of interesting specimens from the Manasquan pounds Mrs Arthur Howes kindly forwarded this material as well as specimens from Toms River, Seaside Park and vicinity My own notes include a number of trips to Seaside Park, April 19 (8), May 17 (9), May 31 (10), July 5 (11), August 22 (12), October 11 (13), Barnegat Bay pound, Sep 13 (14), Beach Haven, May 24 (15) and October 25 (16), Toms River tidal, June 14 (17), Sep 6 (18), and Oct. 4 (19) Mr C B Atkinson sent an interesting collection from Ventnor (20)

OFF-SHORE FISHES

Squalus acanthias Linnaeus [2, 3]

Raja ornata Garman [2, 3]

Raja eglanteria Lacépède.[3]

Pomolobus pseudo-harengus (Wilson) [2]

Conger conger (Linnaeus) [1, 3]

Paralichthys dentatus (Linnaeus) [1, 2, 3]

Paralichthys oblongus (Mitchill) [1, 2, 3]

One sent by Mr Brown is 248 mm long and has the 4 large dark ocelli very conspicuous

Gadus callarias Linnaeus [2]

Phycis chuss (Walbaum) [1, 2]

Phycis tenuis (Mitchill) [1, 3]

Merluccius bilinearis (Mitchill) [1, 2, 3]

Zenopsis conchifer (Lowe) [1, 4]

Grammicolepis brachiusculus Poey Figure 1

A fine example of this rare fish from off Norfolk in 70 fathoms, obtained in February and sent by Mr Springer

Gephyroberyx darwini (Johnson) Figure 2 (obtained by William Axelson)

When fresh general color light rose to pink, becoming gray over whole abdominal cavity, where more or less purplish tints also appear Rim of eye ball, maxillary, preopercle, opercular edge and mandibles bright scarlet Iris grayish Spinous dorsal warm gray Soft vertical fins, as well as paired fins scarlet, deepest in color basally and more orange terminally When placed in alcohol general color becomes more violaceous and the rose or pink tints turn pale vermilion Received January 28, 1937, and caught by Mr Axelson on the edge of the Gulf Stream, east by south of the five-fathom bank light-ship, about 90 miles from Cape May

A much smaller one received from Mr Brown January 27 differs in no important way, likewise a similar specimen from off Cape Henry, obtained by Mr. Springer

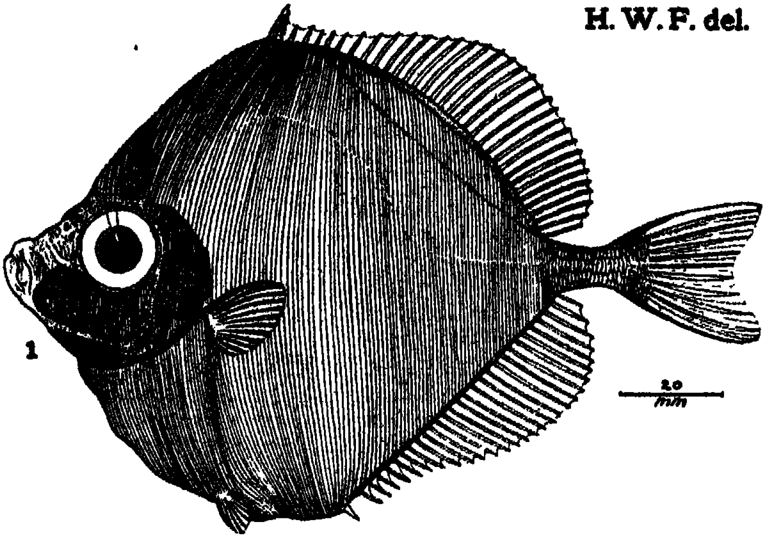
Scomber scombrus Linnaeus [2, 3]

Poronotus triacanthus (Peck) [1, 2, 3]

In this connection I wish to call attention to the name *Stromateus maculatus* Forster 1794 for an Australian fish shown to preclude *Stromateus maculatus* Valenciennes 1833 for a South American stromateid by Whitley 1935, who renames the latter *Stromateus advectitius* This is invalid, as I described the last species as *Stromateus brasiliensis* in these PROCEEDINGS in 1906

Mycteroperca microlepis (Goode and Bean)

Head of a large example sent by Mr Brown, caught by Captain Dallmer's smack "Superior" near the mouth of the Chesapeake Bay along the edge of the Gulf Stream, in March.



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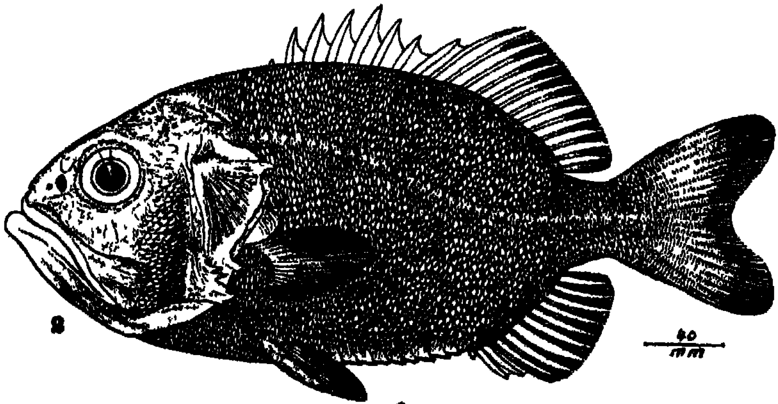

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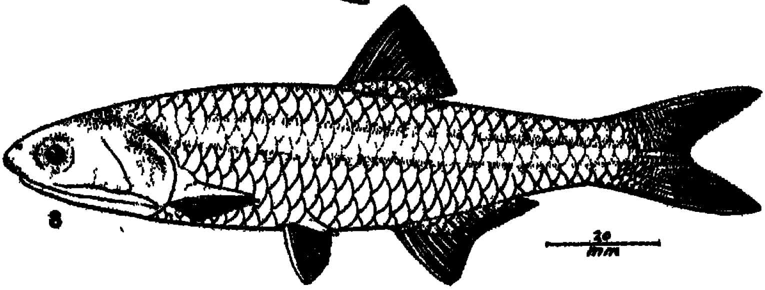


3

1. *Grammicolepis brachiusculus* 2 *Gephyroberyx darwini*
3 *Anchoviella epsetus*

Centropristis striatus (Linnaeus) [1,2,3]

Anthias nicholsi Firth. Figure 4.

Color of back, when fresh, geranium pink to peach-blossom pink, fading paler on lower sides and under surfaces Iris crimson to lake red, with lemon yellow ring around pupil On back, along bases of dorsals, ill-defined band of gallstone yellow Obscurely from upper hind part of eye poorly defined band back to suprascapula and below lateral line, where broadening out to caudal peduncle Deep lemon yellow band from lower hind eye edge to costal region, and another includes all of preorbital back across cheek to upper prepectoral region On tail most of scales with lemon yellow spots, producing obscurely mottled appearance Lower and under sides of body whitish, with median lemon yellow band from symphysis to ventrals Dorsals brilliant rose red or lake red, with upper part of fin chrome to lemon yellow, and bright gamboge blotch on each spine basally Soft dorsal more broadly chrome to lemon yellow, this portion of rays exceptionally brilliant Anal like soft dorsal, basally geranium pink and nearly outer $\frac{3}{4}$ of fin very brilliant lemon yellow Pectoral salmon color Ventral with narrow front edge rose pink, then broadly brilliant chrome yellow, and last or two innermost rays pale pink Caudal largely brilliant chrome yellow, outer half of each lobe pink March 3, from Mr McAdams

Stenotomus chrysops (Linnaeus) [1,2,3]

Cynoscion regalis (Schneider) [1,2,3]

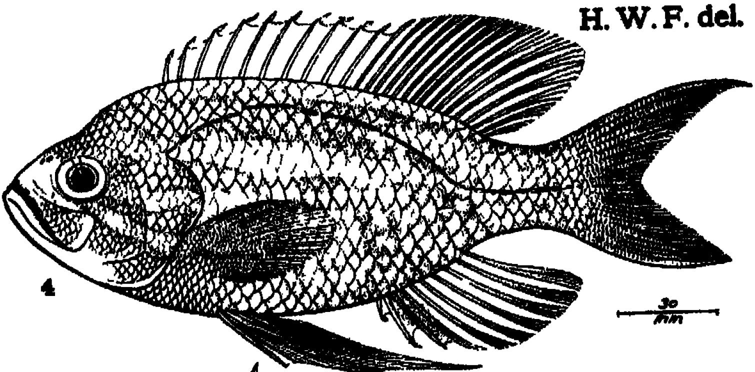
Helicolenus thelmae, new species Figure 5 (Paratype)

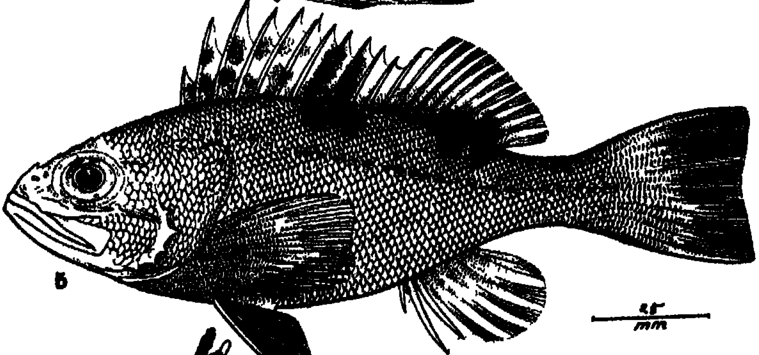
Depth $2\frac{3}{4}$ to $2\frac{4}{5}$, head $2\frac{1}{3}$ to $2\frac{2}{5}$, width 2 Snout, measured to orbit, $4\frac{3}{5}$ to $4\frac{7}{8}$ in head from snout tip, orbit 3 to $3\frac{1}{3}$, eye 4, greater than snout or interorbital, maxillary reaches $\frac{4}{5}$ to $\frac{5}{6}$ in eye, expansion $1\frac{1}{2}$ in eye, length 2 in head from snout tip, teeth villiform, in bands in jaws, on vomer and palatines, bony interorbital narrow, deeply concave, width $2\frac{2}{3}$ to $2\frac{3}{4}$ in orbit Gill rakers 6 + 15, lanceolate, slender, $2\frac{1}{3}$ in orbit, gill filaments $\frac{3}{4}$ of gill rakers

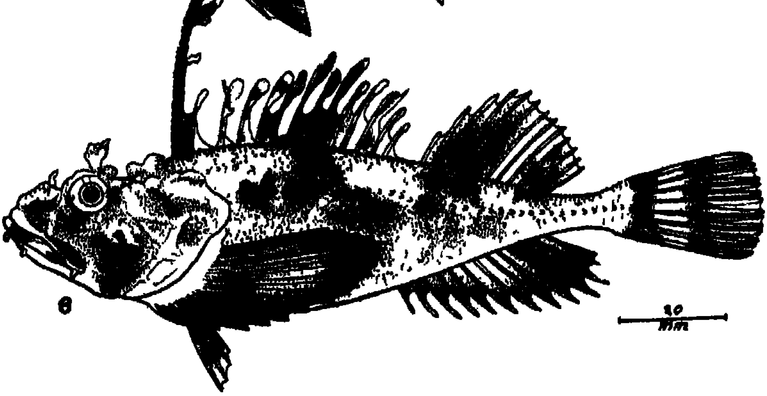
Antero-supraorbital spine large, low, depressed, median supraorbital low, obtuse, followed by 2 larger, low, broad-based postero-supraorbitals, then pair of similar wide set frontal spines, one each side and low keel forward, and well-lowered in interorbital, till opposite front of antero-supraorbital; pair of long widely-set parietal keels followed by 2 close-set backwardly directed spines posteriorly Short postocular keel low, ends in short spine behind Suprascapula with 2 short, strong spines, one above the other Pair of strong though rather slender nasal spines Preorbital with 2 low, broad, blunt spines below, little developed Suborbital stay with low keel, spineless, broken in 3 sections of which last across cheek much longest Preopercle with 5 strong spines, second from upper largest Opercle with 2 spines

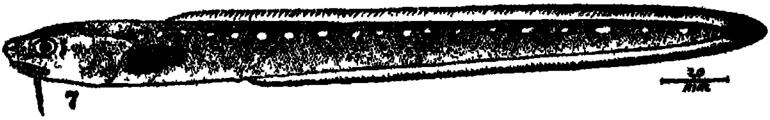
Enlarged scales in lateral line 26+2, scales 58 or 59+ counted along and close above lateral line, 8 above to spinous dorsal origin, or to soft dorsal origin, 17 or 18 below to anal origin, 9 or 10 predorsal forward to occiput; 7 or 8 on cheek below suborbital stay Scales very small on chest and breast, little larger on prepectoral region, also small scales on bases of vertical fins Scales with 20 to 30 short, minute, slender apical denticles; 8 or 9 basal radiating striae; circuli moderately fine.

H. W. F. del.









4 *Anthias nicholsi* 5 *Helicolenus thelmae*
6. *Hemitripterus americanus* 7 *Lepophidium cervinum*

D XII, 11, I, third spine 2⅕ to 2½ in total head length, third ray 2¼ to 2⅓, A. III, 5, I, second spine 2⅗ to 3, first ray 2¼ to 2⅓, caudal 1½, truncate; least depth of caudal peduncle 4 to 4¼, pectoral 1⅓ to 1⅗, rays II, 8, VIII; ventral rays I, 5, fin 1⅗ to 1⅔ in total head length.

When fresh brilliant red, pale to whitish on breast and belly Under surface of head, prepectoral region and lower sides pink. Body with suffused, variable paler areas, appearing like underlaid or pale rosy blotches Edge of maxillary, margin of orbit about eye, and edge of gill opening very bright vermilion Iris rosy pink Inside mouth and gill opening whitish. Dorsals rosy red, membranes of deeper shade than spines and eighth to tenth membranes of spinous fin with dark gray rose blotch Anal rose red Caudal pale vermilion basally, brilliant orange vermilion over greater terminal portion Pectoral vermilion basally, paler terminally Ventral rose, whitish or paler on outer and inner front edges

A N S.P, No 68,261 Near Gulf Stream about 70 miles southeast from Cape May, New Jersey March 6, 1937 Length 163 mm Also No 68,262, paratype, same data Length 155 mm

Compared with Mediterranean specimens of *Helicolenus dactylopterus* (Delaroche), 83 to 250 mm long, that species shows smaller scales on the check below the suborbital stay, or in 12 to 17 rows counted vertically, gill rakers 9 + 17 or 18 Goode and Bean figure a specimen as *H dactylopterus* from the Gulf Stream, shown as 178 mm long and which they say is "slightly reduced" It appears much closer to my Mediterranean specimens, though differs in the absence of scales on its caudal and anal fins basally Both it and my Mediterranean specimens show a spine at the end of the second keel of the suborbital stay or nearly opposite the hind edge of the eye. This is distinct in the young, though small, as well as in the large specimen In *H thelmae* it is not developed, and no scales are present on the maxillary, apparently never having been developed. Its pattern of color also appears different and distinctive

(Named for Mrs Fred McAdams)

Hemitripterus americanus ((Gmelin) Figure 6

An interesting immature specimen, captured by Captain Fred Lund off McCries' Shoal, a few miles off Cape May, and sent by Mr. McAdams, May 11.

Prionotus carolinus (Linnaeus).[3]

Peristedion miniatum Goode and Bean [1, 3]

Antigonia browni Fowler.

Fine example 140 mm. long from off Cape Henry in 70 fathoms, obtained in February and sent by Mr Springer. It agrees in every way with the type

Tautogolabrus adspersus (Walbaum).[1, 8]

Lepophidium cervinum (Goode and Bean) Figure 7

Depth 12½, head 6⅛, width 2⅘ Snout, measured to orbit, 5⅛ in head, orbit 3⅝, eye 5, 1⅛ in snout, slightly greater than interorbital, maxillary reaches opposite hind pupil edge, length from front end 2⅜ in head, teeth firmly erect, rigid, in bands in jaws, with outer row in each enlarged though even, anteriorly in jaws 7 or 8 rows above and 5 or 6 below, broad band of teeth on vomer, and narrow band on each palatine, all of which stronger, more obtuse than in jaws and close set, interorbital 5⅝ in head, little depressed concavely in front to level posteriorly, suborbital and preorbital region more or less cavernous Gill rakers 3 + 6, short, wide-set points

Scales more or less uniformly small, well exposed, about 165 in axial lateral series between gill opening and caudal base, 30 transversely above anal origin Head scaly, except muzzle and mandible, 10 scales on postocular to vertical preopercle ridge Fins scaleless, except small scales on pectoral base Scales cycloid, elongate, with 3 to 9 basal radiating striae, circuli fine, coarser medially

D 113, origin over last ⅜ of depressed pectoral, fin height 1¼ in orbit, caudal 10, equals orbit, A 107, fin height 1¼ in orbit, pectoral rays II, 18, fin 1¾ in head, ventral 3, origin opposite front eye edge, of 2 rays.

Gray brown, paler to semi-translucent below Along back 22 obscurely defined, variable rounded, pale or light blotches Iris gray, pale yellowish ring around pupil Inside gill opening black, continued forward inside mouth along each side of base of tongue as blackish extension Fins grayish, confluent verticals becoming blackish posteriorly, anal with blackish extending nearly whole extent of margin

Near the Gulf Stream, about 70 miles southeast of Cape May, N J 1937 Fred McAdams Length 230 mm

The description by Goode and Bean 1895, and Todd's drawing of figure 306, are imperfect and render identification difficult This figure shows the greatest depth 8⅝ ("10⅛ in total length" in text); head length shown greater than trunk, pectoral 2⅛ in head, ventral base opposite hind part of orbit, orbit 4, confluent dorsal rays 100, caudal 9, anal 85, pectoral rays I, 16, length 1¼ in postocular space

Lophius piscatorius Linnaeus[8]

SHORE FISHES

Carcharias taurus Rafinesque[6]

Isurus tigris (Atwood)

One 1320 mm long, mounted, taken off Seaside Park, August 26, 1936, shown me by Will Farrows.

Mustelus canis (Mitchill)[12, 18]

Pseudotriakis microdon Capello

One 2440 mm. (8 feet) long reported by Mr Hied as caught in the Manasquan pounds in late July 1936. He noted the low keel-like first dorsal fin, a subject of much controversy among the fishermen, also the color as uniform gray above, paler on the belly Though this shark was shipped to New York to be butchered and no part was saved, the identification rests only on the details given by Mr Hied. No previous record for the western Atlantic appears to have been given, other than that based on the Amagansett, Long Island specimen, which I have examined in the U S National Museum

Eulamia plumbeus (Nardo) [18]

One 2440 mm at Bay Head, Sep 11, and another a few days later 2135 mm long

Sphyrna zygaena (Linnaeus) [18]

Photograph sent by Mrs Howes of example 2440 mm long, with *Leptecheneis naucrates* (Linnaeus) attached Caught 75 miles southeast of Barnegat Light

Squalus acanthias Linnaeus [10]

Raja erinacea Mitchill [8, 9, 10, 16]

Raja ocellata Mitchill [8, 9]

Raja eglanteria Lacépede [8, 12, 13]

Raja laevis Mitchill [16]

Myliobatus freminvillii Le Sueur [6, 18]

Rhinoptera bonasus (Mitchill) [14]

Albula vulpes (Linnaeus)

One of 5 lbs August 15, 1936 at Ventnor, reported by Mr Benson

Pomolobus mediocris (Mitchill) [10]

Pomolobus pseudo-harengus (Wilson) [5, 9, 10, 11, 15]

Pomolobus aestivalis (Mitchill) [20]

Alosa sapidissima (Wilson) [5, 15]

Brevoortia tyrannus (Latrobe).[9, 10, 11, 12, 16, 17, 18, 19]

Anchoviella mitchilli (Valenciennes) [16, 20]

Also obtained at Barnegat in March 1936 by Mr Deets

Anchoviella epsetus (Bonnaterre) [18] Figure 3 (June 21, 1936)

Two large specimens, 128 to 138 mm. long, from Ventnor, the smaller caught on hook and line June 11 and the other picked up on the beach June 21, by Mr. Carroll B. Atkinson Compared with an extensive series in the Academy from New Jersey, North Carolina, Florida, West Indies, and Brazil, 45 to 128 mm long, most of the specimens have a broad silvery lateral band, at least as wide as the eye and often much broader or deeper. In the Ventnor specimens this band is distinctly less than the eye diameter in width and the eye 3⅗ to 4 in head (3⅕ to 3⅗ in Academy series noted above) Mr Atkinson writes, for two weeks a number were caught and they were seen jumping out of the water Their color when freshly caught was very transparent, with a very marked, broad, lateral silvery band

Considerable imperfections occur in the published descriptions and figures of this species Jordan and Seale (1926) describe, "belly compressed, serrulate", though in my specimens it has an entire, smooth, scaled median ridge, "cheeks triangular, scarcely larger than eye", which nearly twice as long in my specimens, "lateral silvery band about as wide as the eye", length "four to six inches"

Conger conger (Linnaeus) [7, 10]

Muraena rostrata Le Sueur [14, 17, 19]

Bagre marina (Mitchill)

One from Manasquan, June 22, 1936, obtained by Mr Hied When fresh back deep iridescent blue, sides and below silvery white Barbels pinkish Dorsal gray blue and adipose fin blue black Caudal bluish, old rose tinge on outer edges Anal deep pink, tinted purplish medially Pectoral blue above, white below Ventral pink [Notes by Mrs Howes]

Umbra pygmaea (De Kay) [17]

Fundulus majalis (Walbaum) [14, 20]

Fundulus macrolepidotus (Walbaum) [14, 17, 18, 19]

Fundulus ocellaris Jordan and Gilbert

Specimens were seined with the above two species, listed with "14", and seem to correspond in most every way with this southern species, reported from Louisiana, Florida, North Carolina and Chesapeake Bay I have confused other specimens from southern New Jersey with the preceding species, assuming them to be a young stage

Fundulus diaphanus (Le Sueur) [14, 17, 18, 19]

Lucania parva (Baird) [19]

Cyprinodon variegatus Lacépède [14, 17, 18, 19]

Lophopsetta maculata (Mitchill), [8, 9, 10]

Off Barnegat in March, by Mr Deets

Paralichthys dentatus (Linnaeus) [5, 10, 15]

Pseudopleuronectes americanus (Walbaum) [7]

Achirus fasciatus (Lacépede) [7, 9, 18]

Microgadus tomcod (Walbaum) [20]

Gadus callarias (Linnaeus) [9]

Phycis regius (Walbaum) [9, 10, 11]

Phycis chuss (Walbaum) [16]

Merluccius bilinearis (Mitchill) [10]

Off Brigantine in January, by Mr. Deets

Strongylura marina (Walbaum) [14]

Mugil curema Valenciennes [20]

Menidia notata (Mitchill) [14, 18]

Menidia beryllina (Cope) [18, 19]

Membras vagrans (Goode and Bean) [20]

Apeltes quadracus (Mitchill) [19]

Syngnathus fuscus Storer [20]

Hippocampus hudsonius De Kay [20]

Scomber scombrus Linnaeus [10, 11, 15]

Scomber colias Gmelin [15]

Euthynnus alleteratus (Rafinesque)

One 710 mm long caught off Seaside Park, October 4, 1936, shown me by Mr Farrows

Thunnus thynnus (Linnaeus)

Mounted specimen of 514 lbs taken off Seaside Park, September 7, also shown me by Mr Farrows

Germo alalunga (Bonnaterre)

One caught 75 miles southeast of Barnegat Light in June, reported by Mrs Howes Mr Benson reported two of 35 and 43½ lbs from off Barnegat July 10 These are the first records I have obtained

Scomberomorus maculatus (Mitchill)

Off Sea Isle City, in April, by Mr Deets

Makaira nigricans Lacépède

Mounted specimens, one 6 feet 10 inches long and one 7 feet 5 inches, taken a mile off Barnegat Light, August 11, shown me by Mr Farrows

Xiphias gladius Linnaeus

One of 10 feet at Asbury Park, August 8, 1935, and another from 20 miles off Brielle, June 9, reported by Mr Wm Evans

Oligoplites saurus (Schneider)

One June 14, 1936, taken in Manasquan pound by Charles Hied Back rather narrowly gray, with darker gray markings extending down on the sides Sides and lower surfaces silvery gray with amber mottling Dorsals amber, tinged with pink basally Anal white, reddish tinge basally Caudal dark amber, very light posteriorly, upper and lower edges blackish Pectoral amber. Ventral white, pinkish basally [Note sent by Mrs Howes]

This interesting tropical American fish is new to New Jersey A second specimen was taken a little later.

Seriola zonata (Mitchill) [7]

One 190 mm from Manasquan, one 200 mm. at Ocean City, July 15; reported in Barnegat Bay off Waretown, August 15.

Seriola lalandi Valenciennes

Two, 305 mm. long from Manasquan in October.

Caranx hippos (Linnaeus)

One 208 mm from Manasquan

Caranx crysos (Mitchill)

One 248 mm from Manasquan in September. Dorsal, anal and caudal fins dark gray

Selene vomer (Linnaeus)

One August 3, 1936, in Toms River at Cranmore by Alfred Irons, young from Ocean Gate, September 12, by Richard Bardsley

Trachinotus carolinus (Linnaeus) [7]

Pomatomus saltatrix (Linnaeus) [7, 12, 15]

Rachycentron canadum (Linnaeus)

One 953 mm from Stone Harbor, June 21, 1936, by Mr Deets.

Poronotus triacanthus (Peck) [9, 10, 11, 12, 15]

Palinurichthys perciformis (Mitchill)

One 305 mm caught October 7, 1936, in Back Channel at Brigantine by G H Pennman

Coryphaena hippurus Linnaeus

One 1345 mm August 28, from off Seaside Park, mounted, shown me by Mr Farrows Speckled with blue spots

Perca flavescens (Mitchill) [19]

Pomotis gibbosus (Linnaeus) [5, 8]

Huro floridana (Le Sueur) [19]

Roccus saxatilis (Walbaum) [5, 7, 10, 15]

Maurice River at Bivalve in April, by Mr Deets

Morone americana (Gmelin) [5, 15]

Centropristis striatus (Linnaeus) [7, 9, 10, 15]

Lobotes surinamensis (Bloch)

One 660 mm taken at Beach Arlington, in 1935, mounted and shown me by Mr Farrows

Stenotomus chrysops (Linnaeus) [9, 10, 11, 15]

Cynoscion regalis (Schneider) [5, 10, 15]

Bairdiella chrysura (Lacépède) [20]

Leiostomus xanthurus Lacépède [7]

Micropogon undulatus (Linnaeus) [5, 7, 20]

Menticirrhus saxatilis (Schneider) [5, 15]

Pogonias cromis (Linnaeus) [7, 20]

Myoxocephalus octodecimspinosus (Mitchill) [6]

Prionotus carolinus (Linnaeus) [7, 9, 11, 12]

Prionotus strigatus (Cuvier) [9, 10]

Cyclopterus lumpus Linnaeus

One 270 mm obtained at North Wildwood, April 2, 1936, by Captain Fred Miller, sent by Mr. Deets One 355 mm reported at Young's Pier in the spring by Mr Benson.

Tautoga onitis (Linnaeus) [7]

Gobiosoma bosc (Lacépede) [18]

Enchelyopus anguillaris (Peck)

Large example from Brielle, received from Mr Deets in April

Ammodytes americanus De Kay [20]

Opsanus tau (Linnaeus) [7]

Balistes carolinensis Gmelin [7]

Stephanolepis hispidus (Linnaeus)

One 117 mm long from Manasquan, in June D I, 32, A 32

Sphoeroides maculatus (Schneider) [7, 9, 10, 12, 13, 14, 16]

Chilomycterus schoepfi (Walbaum) [7 13, 14]

Mola mola (Linnaeus)

One off Shark River in late May, of 400 lbs, reported by Mrs Howes One 250 lbs from 30 miles off Atlantic City, July 19, reported by Mr Benson

A COLLECTION OF HAYTIAN FISHES OBTAINED BY MR. STANLEY WOODWARD

BY HENRY W FOWLER

During February of 1936 Mr Woodward, a Trustee of the Academy, visited Port-au-Prince and arranged with Mr Andre Audant of the "Service National de la Production Agricole et de l'Enseignement Rural", to form a collection of Haytian fishes for the Academy museum Accordingly upward of a thousand specimens were secured and preserved in alcohol Some are new records, or of importance geographically and many desiderata to our collections, besides one which is described as new to science I wish to thank Mr Woodward for his interest and care, in securing this valuable addition to the collection of fishes Altogether 112 species are represented

CLUPEIDAE

Harengula sardina Poey

Harengula macrophthalma (Ranzani)

Opisthonema oglinum (Le Sueur)

ENGRAULIDAE

Anchoviella epsetus (Bonnaterre)

Cetengraulis edentulus (Cuvier)

SYNODONTIDAE

Synodus intermedius (Agassiz)

POECILIIDAE

Gambusia beebei Myers

Abundant at Boucan, Gabriel, April 19, 1936, also with the next two species

Limia ornata Regan

Limia nigrofasciata Regan

HEMIRAMPHIDAE

Hemiramphus brasiliensis (Linnaeus).

BOTHIDAE

Syacium micrurum Ranzani

CYNOGLOSSIDAE

Symphurus plagusia (Schneider)

FISTULARIIDAE

Fistularia tabacaria Linnaeus

AULOSTOMIDAE

Aulostomus maculatus Valenciennes

SYNGNATHIDAE

Hippocampus punctulatus Guichenot

SPHYRAENIDAE

Sphyraena guachancho Cuvier

MUGILIDAE

Mugil curema Valenciennes

POLYNEMIDAE

Polydactylus virginicus (Linnaeus)

HOLOCENTRIDAE

Holocentrus adscensionis (Osbeck)

SCOMBRIDAE

Scomberomorus regalis (Bloch)

TRICHIURIDAE

Trichiurus lepturus Linnaeus

STROMATEIDAE

Seserinus paru (Linnaeus)

CARANGIDAE

Oligoplites saurus (Schneider)
Decapterus punctatus (Agassiz)
Caranx bartholomaei Valenciennes
Caranx hippos (Linnaeus)
Caranx latus Agassiz
Blepharis crinitus (Mitchill)
Vomer setapinnis Mitchill
Selene vomer (Linnaeus)
Chloroscombrus chrysurus (Linnaeus)
Trachinotus glaucus (Bloch)

CENTROPOMIDAE

Centropomus undecimalis (Bloch)
Centropomus ensiferus Poey

AMIIDAE

Astrapogon stellatus (Cope)

SERRANIDAE

Cephalopholis fulvus ruber (Schneider)
Cephalopholis fulvus punctatus (Linnaeus).
Serranus striatus (Bloch)

Serranus guttatus (Linnaeus)
Serranus morio (Valenciennes)
Hypoplectrus unicolor (Walbaum)
Prionodes tabacarius (Cuvier)
Diplectrum radiale (Quoy and Gaimard)
Eudulus dispilurus (Gunther)
Rypticus coriaceus (Cope)

PRIACANTHIDAE

Priacanthus arenatus Cuvier

LUTJANIDAE

Lutjanus griseus (Linnaeus)
Lutjanus synagris (Linnaeus)
Lutjanus jocu (Schneider)
Lutjanus analis (Cuvier)
Ocyurus chrysurus (Bloch)
Rhomboplites aurorubens (Cuvier)

POMADASYIDAE

Haemulon plumieri (Lacépede)
Haemulon macrostomum Gunther
Haemulon flavolineatum (Desmarest)
Haemulon bonariense Cuvier
Bathystoma rimator (Jordan and Swain)
Anisotremus virginicus (Linnaeus)

SPARIDAE

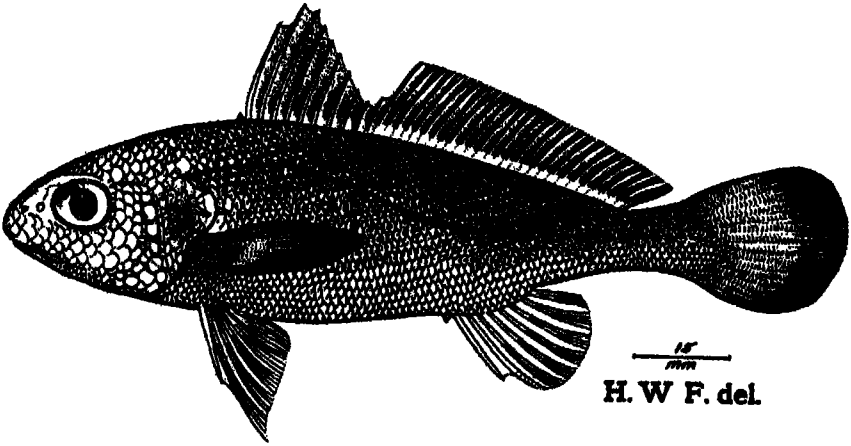
Calamus arctifrons Goode and Bean
Archosargus unimaculatus (Bloch)

SCIAENIDAE

Odontoscion dentex (Cuvier)
Stellifer colonensis Meek and Hildebrand
Ophioscion woodwardi, new species

Depth 3¼ to 3½, head 3⅛ to 3¼, width 2⅓ to 2½ Snout 3½ to 3⅞ in head; eye 3½ to 4⅝, 1 to 1⅓ in snout, 1 to 1⅛ in interorbital, maxillary reaches ⅓ to ½ in eye, length 2⅝ to 2⅞ in head, bands of fine villiform teeth in jaws, narrowing posteriorly in width, lower face of mandible with 5, rather large, close-set pores; interorbital 3⅞ to 4⅛, low, broadly convex; hind preopercle edge with 11 or 12 firm denticles, of which 2 lowest little enlarged Gill rakers 10 + 14, lanceolate, slender, 1⅓ in gill filaments, which 2¼ in eye

Scales 51 to 53 along and close above lateral line to caudal base, tubular scales 42 or 43 + 24 to 26 in lateral line, last extend medially on caudal nearly or quite to its tip, 7 above, 9 below, 35 or 36 predorsal forward to snout end Cheek with 3 rather large scales between eye and preopercular ridge Scales on chest, prepectoral region and breast small. Basal sheath of soft dorsal 1 or 2 scales wide Anal with low basal scaly sheath. Caudal finely scaled basally Scales with 12 to 13 basal radiating striae, 27 to 30 apical denticles, with 5 or 6 series of basal elements transversely; circuli fine, above and below coarse, apically absent



Ophioscion woodwardi

D XI, 28, I or 29, I, fourth spine 1¾ to 1⅘ in head, first branched ray 2⅕ to 2⅗, A II, 7, I, second spine 2⅕ to 2⅗, first ray 1⅘ to 1⅞, caudal 1⅕ to 1¼, cuneate behind or with infero-median rays little longest, least depth of caudal peduncle 3⅔ to 3⅘, pectoral 1¼ to 1¼, rays II, 15 to II, 17; ventral rays 1⅗ to 1¾ in head

Back very pale or light olivaceous, sides and lower surfaces bright silvery white On back and sides each row of scales, their courses oblique and crossing lateral line, with pale olivaceous median spot, thus forming obscure or faint lines Superimposed along course of lateral line at upper costal region, about 11 or 12 slightly darker, parallel and less inclined short faint bars, not reaching far above lateral line or below level of pectoral Iris whitish. Opercle dark gray First dorsal whitish basally, each membrane gray black terminally, due to closely-set dark dots. Soft dorsal whitish, each membrane with dark gray bar terminally and close before each ray Pectoral and caudal grayish Ventral and anal whitish, each fin pale yellowish medially.

A N S. P, No 68,257 Port-au-Prince, Haiti, 1936 Andre Audant Collection of Stanley Woodward Length 134 mm Type.

A.N S P, Nos 68,258 to 68,260 Same data Paratypes Length 103 to 112 mm.

Distinguished chiefly by its increased fin rays, proportions, long caudal, moderately protruding snout, and apparently related to the Pacific coast *Ophioscion simulus* Gilbert and *O. imiceps* (Jordan and Gilbert)

(Named for Mr Stanley Woodward.)

Eques punctatus Schneider.

Eques lanceolatus (Linnaeus)

GERRIDAE

Eucinostomus gula (Cuvier)
Gerres cinereus (Walbaum)
Diapterus rhombeus (Cuvier)

MULLIDAE

Pseudupeneus maculatus (Bloch)
Pseudupeneus martinicus (Cuvier)

MALACANTHIDAE

Malacanthus plumieri (Bloch)

EPHIPPIDAE

Chaetodipterus faber (Broussonet)

CHAETODONTIDAE

Chaetodon capistratus Linnaeus
Pomacanthus paru (Bloch)
Angelichthys ciliaris (Linnaeus)

HEPATIDAE

Hepatus caeruleus (Schneider)
Hepatus bahianus (Castelnau)
Hepatus hepatus (Linnaeus)

SCORPAENIDAE

Scorpaena quadricornis Cuvier

TRIGLIDAE

Prionotus punctatus (Bloch)

CICHLIDAE

Cichlasoma adspersum (Gunther)

POMACENTRIDAE

Pomacentrus adustus (Troschel)
Pomacentrus fuscus Cuvier
Pomacentrus leucostictus (Muller and Troschel)
Abudefduf marginatus (Bloch)

LABRIDAE

Lachnolaimus maximus (Walbaum)
Halichoeres garnoti (Valenciennes)
Halichoeres caudalis (Poey)
Halichoeres radiatus (Linnaeus)
Thalassoma bifasciatum (Bloch)

CALLYODONTIDAE

Cryptotomus ustus (Valenciennes)
Cryptotomus beryllinus Jordan and Swain

Sparisoma abildgaardi (Bloch)

Sparisoma chrysopterum (Schneider)

Callyodon croicensis (Bloch).

Callyodon emblemmaticus (Jordan and Rutter)

ELEOTRIDAE

Dormitator maculatus (Bloch)

GOBIIDAE

Chonophorus taiasica (Lichtenstein).

Gobius oceanicus Pallas

MONACANTHIDAE

Monacanthus ciliatus (Mitchill).

Monacanthus oppositus Poey

Cantherines pullus (Ranzani)

Aluterus scriptus (Osbeck)

OSTRACIONTIDAE

Lactophrys triqueter (Linnaeus)

Lactophrys bicaudalis (Linnaeus)

Lactophrys tricornis (Linnaeus)

TETRODONTIDAE

Lagocephalus laevigatus (Linnaeus)

Sphoeroides spengleri (Bloch)

DIODONTIDAE

Diodon holacanthus Linnaeus

ANTENNARIIDAE

Antennarius tigris Poey.

ONCOCEPHALIDAE

Oncocephalus nasutus (Valenciennes)

Halieutichthys aculeatus (Mitchill)

FAUNAL WORKS

BEEBE, WILLIAM, and JOHN TEE-VAN 1928 The Fishes of Port-au-Prince Bay, Haiti. Zoologica, Sci Contrib N Y Zool Soc vol 10, no 1, pp 1-279, many outline text figures

FOWLER, HENRY W, 1910 A new albuloid fish from Santo Domingo Proc Acad Nat Sci Phila vol 62, pp 651 to 654, 1 fig.

1919 Notes on Tropical American Fishes, Hayti l c., p. 149 (with bibliographic references)

1928. Fishes from Florida and the West Indies, Haiti l.c, vol 80, pp 456 to 462.

MYERS, GEORGE S, 1928 The Existence of Cichlid Fishes in Santo Domingo. Copeia, No 167, June 28, 1928, pp 83 to 86

1931 Poeciliid fishes of the genus *Mollienisia* in Hispaniola, with notice of a new *Limia* from the Samana Peninsula Amer Mus Novit, N Y, No. 503, pp 1 and 2

1935 An Annotated List of the Cyprinodont Fishes of Hispaniola, with descriptions of two new species Zoologica, N Y Zool Soc, vol 10, No 3, pp 301 to 316

NICHOLS, JOHN T, 1915 On *Heterandria zonata* sp nov and *Heterandria versicolor* (Günther) from the island of San Domingo Bull Amer Mus Nat Hist, N Y, vol 34, pp 603 to 604, figs 1 to 3

NICHOLS, JOHN T, and GEORGE S MYERS 1923 A new *Limia* from San Domingo Amer Mus Novit, N Y, No 79, pp 1 and 2

A SECOND STUDY OF NEW AND LITTLE-KNOWN MADAGASCAR GROUSE-LOCUSTS (ORTHOPTERA, ACRIDIDAE, ACRYDIINAE), WITH A KEY TO THE SPECIES OF THYMOCHARES

BY JAMES A G REHN

In 1929 it was my privilege to publish the descriptions of a number of new genera and species of Madagascar grouse-locusts,[1] in which paper was also included observations on types of certain Malagasy species, and genera, previously described by Dr J L. Hancock and now contained in the Morgan Hebard Collection, deposited in the Academy of Natural Sciences of Philadelphia

Since that time other collections of the group from Madagascar have been received by Mr Hebard and by the Academy, and in this paper the descriptions of four very distinctive new species included in the more recent additions are presented, together with supplementary records of species previously described or recorded by me, and a critical discussion of the genus *Thymochares*, to which belong two of the four new species here described

The genus *Procytettix*, of which a Madagascar species is here described, was previously known only from the Seychelles, while the nearest relationship of the Malagasy genus *Thymochares* is here shown to be with the Seychellian *Coptottigia*

Metrodorae

Oxytettix[2] **cataphractus**,[3] new species Plate 12, figs 1 and 2

Differing from the genotypic species *O hastatus* (Hancock),[4] with the type and original series of which the present form has been compared, in the smaller size, less elevated dorsal section of head, more heavily sculptured dorsum of the pronotum, more pronounced cicatriform character of the paired nodes on the dorsum of the caudal process, more definitely undulate lateral carinae of the pronotum caudad of the humeral angles, the less sharply acute character of the sinus of the caudal margin of the lateral lobes of the pronotum, the less attenuate and less distinctly compressed ultimate sternite (subgenital plate) of the male and in the shorter, stouter, much more robust and more deeply sculptured caudal femora

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[1] New and Little-known Madagascar Grouse-locusts (Orthoptera, Acrididae, Acrydiinae) Proc Acad Nat. Sci Phila., LXXXI, pp 477-519, pls 17-21

[2] Substituted by Rehn (Proc. Acad Nat Sci Phila, LXXXI, p 482, (1929)), for the preoccupied generic name *Oxynotus* Hancock

[3] Clad in mail, in allusion to the armored dorsum of the pronotum

[4] See Rehn, Proc Acad. Nat Sci Phila, LXXXI, p 482, (1929).

The two species are quite distinct from one another and their separation should in no way be difficult.

Type.—♂; Analamazotra, Great Eastern Forest, Madagascar. October 20, 1930. (Olsoufeiff.) [Hebard Collection, Type no. 1303.]

Size small; form robust, subdepressed; surface rugose, particularly of the pronotal disk and the caudal femora, general surface of head, pronotum and much of limbs minutely shagreenous, on dorsum of pronotum impresso-cribose between major sculptural features.

Head with greatest width of vertex, as seen from dorsum, subequal to the width of one of the eyes, latero-cephalic margining carinae arcuately converging cephalad, narrowly failing to meet the median carina, which projects very weakly cephalad of the line of the vertex and extends but a short distance caudad, surface of vertex bifossulate between the eye border and latero-cephalic carinae and the median carina, these fossae separated from the occiput proper by a transverse series of low shagreenous points; in lateral aspect the occipital line is seen to be moderately ascending to the vertex, which is not evident in profile, being masked by the eye; fastigio-facial angulation of the median carina rounded rectangulate, not projecting at all cephalad of the eyes; interantennal protuberance of the frontal costa rather marked and strongly arcuate when seen in profile, its curvature dorsad starting between the paired ocelli, which are placed very faintly ventrad of the middle of the eyes; frontal costa very narrow, linearly sulcate from half way between the vertex and the paired ocelli to the median ocellus, margins subparallel, hardly at all diverging ventrad; width of head across genae about one and one-tenth the width across the eyes; eyes subglobose, very faintly flattened dorsad. Antennae slightly shorter than the caudal femur, composed of twelve articles, those distad of the two proximal ones slender and subflagellate, third faintly longer than first, fourth three-fifths the length of third, fifth to eighth progressively increasing in length, ninth equal to eighth, tenth slightly shorter than ninth, slightly deplanate and widened, eleventh as tenth but shorter, twelfth slightly shorter than eleventh, aciculate.

Pronotum relatively short, its aciculate caudal extremity not surpassing the apex of the abdomen and distinctly failing to reach the apices of the caudal femora; greatest width across spiniform processes of the lateral lobes contained one and two-third times in the greatest pronotal length, greatest width across humeral angles contained slightly less than three and one-third times in the pronotal length; cephalic margin of pronotal disk transverse truncate, anterior carinae brief but marked, subparallel, surface of pronotum between shallowly excavate; lateral carinae obsolete between principal sulci, humeral angle of same broadly obtuse as seen from dorsum, thence to caudal extremity the lateral carinae are distinct and undulate, from briefly cephalad of the humeral angles bordered mesad by a distinct but fluctuating parallel carination; median carina of pronotum continuous and evident throughout but less marked immediately cephalad than elsewhere, in profile gently undulate, of even width except that between the principal sulci it is more inflated laterad than elsewhere; principal transverse sulci distinct, neither severing the median carina; surface of pronotal disk rather deeply and rugosely sculptured, in fact almost corrugated, a pair of shallow and rounded fossae placed immediately cephalad of the line of the humeral angles, a deeply impressed pair, nearer the median carina, briefly caudad of the same line, followed by a third deep pair more lateral in position, a more shallow fourth pair and finally a preapical single impression crossed by the median carina, the areas between the fossae are elevated cicatriform, two between the humeral angles and a following pair being obliquely disposed sublinear ridges lateral lobes with the spiniform laterad directed processes of the ventro-caudal angles pronounced, very acute, the cephalic margin of same, as seen from dorsum, nearly straight oblique, the caudal margin of the processes concavo-emarginate, seen in cephalic aspect the processes are distinctly deplanate, humeral sinus slightly acute, almost no trace of a carinula from the sinus to the humeral angle, scapular area relatively broad proximad, regularly narrowing distad, dorsal border formed by the undulate lateral carina

No evident tegmina or wings

Ultimate abdominal sternite (subgenital plate) with greatest proximal width equal to two-thirds of median length on ventral surface, seen in ventral aspect the dorso-lateral margins are arcuately convergent to the narrow, blunted and very briefly fissate apex, dorsal aspect with the deplanate paired lateral plates shallowly concave

Cephalic femora with dorsal carina slightly undulate, in no way lobate, median femora with both dorsal and ventral carinae moderately undulate Caudal femora robust, greatest depth slightly greater than a third the femoral length, dorsal carina finely serrulate, pregenicular lobe low, rectangulate, dorso-lateral face with the oblique cicatriform ridges ten in number, of which the four central ones are much larger than the others and distinctly strumose-elevated, pagina with seven oblique shagreenous rugae, of which three are more decided and conspicuous than the others, ventro-lateral face broad, relatively full, without sculpture caudal tibiae with concavity of extensor surface marked, the same weakly broadening distad, elevated lateral borders serrato-dentate and finely serrulate as usual in the group caudal tarsi with proximal and distal articles subequal in length

General color cinnamon-brown to dresden brown, washed over much of the face, genae, occiput, a portion of pleura, most of abdomen and ventral surface of body, ventro-external faces of caudal femora, and clouding of all femora and annulation of cephalic and median tibiae and tarsi with blackish fuscous Eyes light brownish olive, mottled with mummy brown Antennae distad of proximal article mummy brown, a preapical area involving slightly more than the entire tenth article and very narrow distal borders to the others distad of the second, creamy white Pronotum with its base chiefly cinnamon-brown, most of its more impressed areas washed with mummy brown, as is also part of the scapular area Caudal femora with internal face blackish, incompletely trifasciate with light ochraceous-buff, the pregenicular pale bar nearly complete, certain of the large strumosities of the dorso-lateral face indistinctly pencilled with mummy brown, caudal tibiae solidly blackish fuscous except for a pregenicular annulus of dresden brown, caudal tarsi annulate alternately with dresden brown and blackish fuscous similar to the cephalic and median pairs

Length of body, 7.47 mm.; length of pronotum, 6.29, greatest width across lateral process of pronotum, 3 94, length of caudal femur, 4 62

The type of this very striking species is unique

Cryptotettix imerina Rehn.

1929 *Cryptotettix imerina* Rehn, Proc Acad Nat Sci Phila, LXXXI, p 487, pl 17, figs 9-12 [♀, Madagascar]

Analamazotra, Great Eastern Forest, November, 1930, (Olsoufeiff), one male, one female, [Hebard Cln]

These specimens have been compared with the type

Holocerus lucifer (Serville)

1839 *Tetrix lucifer* Serville, Hist Nat Ins, Orth, p 758. [♀, Madagascar]

Analamazotra, Great Eastern Forest, November, 1930; (Olsoufeiff), one male, one immature male, [Hebard Cln]

Cayus, Great Eastern Forest, May, 1925, (Lamberton), one male, [A N S P]

I have already figured this remarkable species and as well as the related *H. taurus*[5]

Andriana pyramidata Rehn

1929 *Andriana pyramidata* Rehn Proc Acad Nat Sci Phila, LXXXI, p 506, pl 20, figs 7-8, pl 21, figs 1-2 [♀, ♂, Madagascar]

Analamazotra, Great Eastern Forest, November, 1930, (Olsoufeiff), two males, four females, [Hebard Cln]

In the original description I discussed the very considerable amount of variation in size and coloration found in the original series The present representation fully supports the previous conclusions, in addition the minima of both sexes are slightly smaller than those previously given. Certain of the present series show a very definite ground color of olive-buff, but a single individual, a female, being as dark as brownish fuscous

Procytettix[6] ***hova***, new species Plate 12, figs 3 and 4

When compared with the genotypic species *P. fusiformis* Bolivar,[7] the present form is seen to differ in the somewhat more produced vertex, proportionately longer pronotum with a regularly low arcuate median crest, smoother and non-gibbulose surface and rectangulate caudal apex of same, in the shorter and more robust limbs, particularly the caudal femora, and more nearly equal pulvilli of the proximal article of the caudal tarsi

Type — ♂, Analamazotra, Great Eastern Forest, Madagascar. October 20, 1930 (Olsoufeiff) [Hebard Collection, Type no 1304.]

Size larger than of *P fusiformis*, form generally similar but pronotum more produced and more arcuate longitudinally

Vertex as seen from dorsum with its interocular width faintly greater than width of one of the eyes, projection of vertex cephalad of eyes equal to slightly more than half of interocular width, semi-ovate in outline, the margins of projection regularly arcuate convergent to the slightly more protuberant median carina, which continued caudad becomes obsolete on the occiput, surface of vertex subarcuate in transverse section, in profile the line of the occiput is moderately straight ascendent over vertex and subacutely rounds in a very definitely produced and subacute fastigio-facial angle to the facial line, which is thence briefly oblique retreating to very shortly dorsad of the paired ocelli, from which point the profile ventrad is distinctly but much less decidedly retreating, the portion to the median ocellus very low arcuate frontal costa extending from very briefly dorsad of the paired ocelli to the median one, narrow, distinctly sulcate, the margins but faintly divergent ventrad paired ocelli placed on a line between the centers of the eye depth· eyes moderately protuberant, their outline as seen in lateral view subpyramidical, the greatest width (at ventral fourth) but slightly less than greatest length of same antennae inserted between lower fourths of eyes, composed of thirteen articles, those distad of the proximal two slender

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[5] Proc Acad Nat Sci Phila, LXXXI, p 493, pl 19, figs. 2 and 3, (1929)

[6] This genus was described in 1912 by Bolivar (Trans Linn Soc London, 2nd ser., Zool, XV, p 265 pl XIII, fig 2), based on *P fusiformis* from Mahé, in the Seychelles. He then placed the genus after *Ocytettix* Hancock.

[7] Idem [♀, Forest at summit of Morne Pilot, Mahé, Seychelles.]

Pronotum as a whole distinctly tectate, in profile the median carina is evenly low arcuate throughout, greatest depth from lowest point of lateral lobes to highest point of median carina contained two and two-fifth times in the pronotal length, the caudal extremity reaching distad to slightly caudad of the middle of the caudal femora and leaving exposed a distal section of the abdomen not quite twice as long as the exposed dorsal length of the head, greatest width of pronotum across the ventral angles of the lateral lobes contained one and three-fourth times in the pronotal length, and that across the humeral angles slightly less than two and two-fifth times in the same length cephalic margin of the pronotal disk very weakly obtuse-angulate, anterior carinae definitely indicated caudad to the first transverse sulcus, faintly convergent caudad, lateral carinae continuously indicated from the principal transverse sulcus caudad to the pronotal extremity, obtuse-angulate at the but moderately indicated and not at all produced humeral angles, thence caudad regularly convergent to the broadly arcuate caudal point of the pronotum, median tectate carina entire, not severed, as a whole the culminating ridge of the evenly tectate dorsum, but the ridge itself faintly more compressed on a line with the first transverse carina, surface of dorsum shallowly cribrose-rugulose but not deeply sculptured lateral lobes of pronotum with ventral margin oblique subarcuate, ventro-caudal process at apex narrowly subtruncate, not at all reflexed, humeral sinus acutely incised; humero-apical carina between humeral sinus and humeral angle distinct, nearly straight oblique, scapular area broad, point of greatest width of same very faintly caudad of humeral angle, subequal to one-third the greatest (dorsal) length of the lateral lobes of pronotum, scapular area regularly narrowing thence distad, ending at the beginning of the distal arcuation of the dorsal surface where the lateral margin of the pronotum joins the lateral carina

Tegmina and wings not evident

Ultimate sternite (subgenital plate) distinctly compressed, subconical, medio-longitudinally carinate ventrad, immediate apex briefly and narrowly fissate, concave paired plates of the dorsal surface of the same sternite in contact for most of their evident length, ultimate evident tergite (supra-anal plate) relatively small, elongate acute trigonal

Cephalic and median femora moderately slender, greatest depth of cephalic contained about three and one-third, and of median three times in their respective lengths, margins carinate but non-lobate, caudal face of cephalic pair unicarinate, cephalic face of median pair bicarinate; cephalic and median tibiae subcompressed, subsulcate dorsad, non-lobate caudal femora relatively robust, greatest depth contained two and four-fifth times in the femoral length, dorsal carina with the pregenicular lobe distinct, slightly acute, dorso-lateral surface with the oblique ridges not deeply sculptured, not at all cicatriform, external pagina obliquely and not at all deeply patterned, ventro-lateral surface broad caudal tibiae with six to seven definite marginal dentiform spines on the finely serrulate lateral canthi caudal tarsi with proximal article half again as long as distal one, pulvilli of distal article of virtually equal length

Allotype — ♀, same data as type but taken November, 1930 [Hebard Collection]

The following features are those of difference from the above description of the male sex

Size slightly larger form similar to that of male

Vertex with width between eyes equal to one and one-quarter times the eye width, head otherwise as in male

Pronotum with greatest depth proportionately slightly less than in male, contained two and nine-twentieth times in pronotal length, carinae, surface details and sculpture as in male

Ovipositor jaws compressed, narrow, dorsal pair at deepest point nearly twice as deep as ventral, dorsal valves with dorsal surface in profile low arcuate, narrow, alternately biseriate serrato-dentate, ventral valves subarcuate in profile, margins serrato-dentate, ultimate sternite relatively large, subcompressed, scoop-like, distal half of dorsal margin evenly arcuate to apex when seen in profile, immediate apex with a small rectangulate, dorsad recurved process Cephalic and median femora slightly less robust and more slender than in the male, the greatest depth of cephalic contained three and seven-eighth, of median four times in their respective lengths caudal limbs as in male

Base color ranging from dull russet (type) to bister on one hand (paratype) and drab on the other (allotype), mottled to a variable degree with a clove brown pattern of small cloudings and carinal beading which produces a " pepper and salt " appearance, particularly in the bister and drab females, the male type, which is dull russet, having these overlying pattern features much less general or evident The head in all is more infuscate than most of the body, the eyes are snuff brown to cinnamon-brown, the antennae buckthorn brown with the two proximal articles as dark as the head In the paratypic female there is an indefinite concentration of clove brown posthumerally on the disk which suggests the frequent dark triangles there found in certain phases of many species of grouse-locusts The caudal femora have the ventro-lateral face appreciably and quite solidly infuscate, while in all the females the carinal dark beading of these limbs is marked

Measurements (in millimeters)

	Length of body	Length of pronotum	Greatest width of pronotum across lateral lobes	Greatest width of pronotum across humeral angles	Length of caudal femur
♂, *type*	8.4	5.36	3.02	2.26	5.2
♀, *allotype*	11.5	6.88	3.36	2.52	5.78
♀, *paratype*	11.3	5.7	3.36	2.35	5.62

In addition to the type and allotype I have before me a paratypic female bearing the same data as the type. Except for color features noted above, and its faintly smaller size, this individual does not differ appreciably for the allotype.

The discovery of a species of *Procytettix* on the island of Madagascar is of particular interest, adding as it does to the extensive information now available on the intimate relationship and common origin of Madagascar and Seychellian types.

Acrydiinae

THYMOCHARES Rehn

1929 *Thymochares* Rehn, Proc. Acad. Nat. Sci. Phila., LXXXI, p. 477.

Examined anew in the light of additional material it is now evident that *Thymochares* is not nearly related to *Deltonotus* Hancock, as originally stated, the features of resemblance, and apparent affinity, being due to the parallelism in general structure which produces compressed, tectato-cristate forms in a number of groups of the Acrydiinae. The difference in form of the costal region of the face already noted, and certain details of the vertex clearly indicate that *Thymochares* must be removed from the Cladonotae.

It is now clear the Bolivar's monotypic genus *Coptottigia*,[8] known only from the Seychelles, is very definitely the nearest, and in fact a very close, relative. However, the description and single figure of Bolivar's genus and species leave much to be desired; the pronotum is said to be subdeplanate toward the apex and that section is also described as obtusely sinuate, neither of which conditions are seen in *Thymochares*. The fastigial structure and the form of the frontal costa of *Thymochares* are as figured for *Coptottigia*, but we are unable to learn anything regarding the general form, proportions and surface sculpture of the caudal femora, or the form and development of the pronotal scapular area, which is such a striking feature in *Thymochares*. The sole figure of *Coptottigia* is of the cephalic aspect of the insect and this sheds no light on these important characters of *Thymochares*.

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[8] Trans. Linn. Soc. London, 2nd ser., Zool., XV, p. 267, pl. 13, fig. 4, (1912). Genotype.—*C. cristata*, Bolivar, from Silhouette and Mahé, Seychelles (both sexes known).

For the present I would prefer to consider *Thymochares* a near relation of *Coptottigia*, pending physical comparison with the latter. The relationship of both to *Coptotettix* appears definite, and until information to the contrary is produced they should be placed in the vicinity of that broadly distributed genus

The genotypic species, *T galeatus*, is known to me only from the unique type now in the British Museum of Natural History

Having examined all the known species of the genus I am presenting the following preliminary key for their separation, realizing its incompleteness as both sexes are known for no one of them However, the features which separate the forms are so decided their recognition should not be difficult

1 Vertex little, if at all, elevated dorsad of the eyes Frontal costa narrower, with margins subparallel Pronotum with humero-apical carina marked but not sublamellate at any point, dorsal surface of pronotum not at all fossulate Caudal femora relatively slender, greatest width equal to one-third of length, dorsal carina not lamellato-elevated 2

Vertex distinctly elevated dorsad of the eyes Frontal costa broader, with margins distinctly though gradually diverging ventrad Pronotum with humero-apical carina marked and distinctly adpressed sublamellate dorsad of the insertion of the caudal femora, dorsal surface of pronotum distinctly excavato-fossulate dorsal of the caudal coxae Caudal femora robust, greatest width equal to two-fifths of length, dorsal carina distinctly lamellato-elevated *crassipes*, new species

2 Cephalic margin of pronotum but moderately produced over occiput, broadly obtuse-angulate when seen from dorsum, scapular area of pronotum broader, pronotal crest not evenly arcuate, caudal half more straight oblique toward caudal extremity *bolivari*, new species

Cephalic margin of pronotum sharply produced over occiput, acute-angulate when seen from dorsum; scapular area of pronotum narrower, pronotal crest evenly arcuate *galeatus* Rehn

Thymochares crassipes, new species Plate 12, figs 5-7

The above key sets forth the more striking differential features of this species, which is heavier, more rugose and with much stouter caudal femora than either of its relatives At first glance it might be considered the female sex of *bolivari*, particularly as it is from the same locality, but the many features of difference which are distinctly more than sexual in importance, require its recognition as a distinct species The fact that *T. galeatus* is known only from the female sex, and that it more nearly resembles *T bolivari*, of which we are acquainted only with the male, would indicate that *crassipes* must be recognised as a distinct species

Type.—♀; Analamazotra, Great Eastern Forest, Madagascar October 20, 1930 (Olsoufeiff) [Hebard Collection, Type no. 1301.]

Size large (for genus) form robust, appreciably compressed, median crest of pronotum well elevated and cephalad arcuate in profile, without normally evident tegmina and wings surface rugose, with a quite general micro-sculpture of elevated shagreenous points

Head with width across genae subequal to that across eyes seen from dorsum vertex equals half of total width across eyes, and extends briefly cephalad of eyes in a low regular arcuation, the marginal cingulation of which is broken mesad by the projecting median carina, dorsal surface of vertex bifossulate, these extending obliquely caudo-laterad and becoming mere narrow but relatively deep sulcations caudad of the eyes, mesad of which sulci a low but distinct obliquely transverse carinate node marks on each side the cephalic limit of the occiput seen in lateral aspect the occipital line ascends to the median carina, which broadly arcuate over the fastigia-facial angle passes without break into the lateral margins of the frontal costa, which latter are low but quite definite and ventrad obliquely and evenly become less evident to the median ocellus frontal costa in cephalic aspect produced by a forking of the median carina at a point slightly dorsad of the paired ocelli and on a line with the dorsal point of the eyes, thence the sublamellate lateral margins of the costa regularly but not at all decidedly diverge, enclosing a deeply sulcate costa which reaches ventrad to the median ocellus but is to no degree scutellate, its greatest width not exceeding four-elevenths of the interocular width of the vertex Antennae inserted between the lower thirds of the eyes and appreciably ventrad of the paired ocelli, basal articles only remaining in type Eyes broad trigonal in basal outline, greatest depth to greatest width as 13 to 11, seen in dorsal and cephalic aspect moderately prominent

Pronotum with greatest width across the caudo-lateral angles of the lateral lobes equal to almost half of the pronotal length, width at the usual position of the humeral angles faintly less than five-eighths of the width across the lobes, in lateral view the greatest pronotal depth, i e from highest point of arcuation of the crest to ventral point of caudo-lateral angles of the lateral lobes, equals two-fifths of the pronotal length arcuation of the median carina regular in cephalic half, thence caudad nearly straight oblique to apex, highest point of crest at one-third of the length, cephalic margin of pronotum obtuse-angulately produced over the occiput, lateral carinae, as seen from dorsum, straight convergent to the acute apex of the pronotum; humero-apical carinae extending from the sinus of the caudal margin of the lateral lobes of the pronotum in a broad arcuation dorsad of the caudal coxae, there sublamellate, adpressed, and marking off a broad scapular area, the width of which is almost one-third the length of the area, ventral margin of scapular area concave in cephalic half, nearly straight oblique in caudal half, anterior carinae short, not strongly indicated, subarcuately convergent caudad; humeral angles subobsolete, lateral lobes with sinus of caudal margin acutely excavate, the point of angle and the ventral margin of sinus rounded, lateral point of caudo-lateral production of lobes rectangulate, usual caudal truncation of area appreciably though shallowly concave: surface of dorsum of pronotum, particularly in caudal half, with distinct but rounded anastomosing subcarinate irregular welt-like ridges, which are chiefly transverse in disposition, on which and in the intervals between which are scattered low acute tuberculate asperities in addition to the much more thickly disposed shagreenous sculpture, paired posthumeral fossulations of the disk marked, reaching across the whole dorsum on each side of the crest but without defining margins and their surface passing evenly into that of remainder of the dorsum.

No trace of tegmina or wings

Ovipositor valves rather strongly compressed, dorsal pair much deeper and heavier than ventral, extensor margins of both pairs with teeth sharp and definite, apices of ventral valves moderately decurved ultimate sternite (subgenital plate) compressed, subquadrate, marginally area at apex of same indented and with distad ends of lateral margins narrowly lapping over and clasping the lateral borders of the apical area

Cephalic and median femora slender, length equal to approximately five times the depth, longitudinal carinae distinct, dorsal one almost straight Caudal femora robust, broad, greatest width equal to two-fifths the length, least pregenicular depth (including median carina) equal to two-fifths of greatest depth, dorsal carina strongly elevated, lamellate, entire except for the usual marginal micro-serrulation, dorso-external surface with the usual oblique cicatriform nodes quite marked, large and rounded, numbering eleven including that at the base of the genicular arch, portions of their surfaces glabrous and the remainder with shagreenous points, carinae bordering lateral pagina dorsad and ventrad marked, well elevated, pattern of pagina sharp, made up of seven oblique rugae bearing shagreenous asperities, ventro-external surface deeply canaliculate, ventral carina low arcuate, lamellate caudal tibiae slightly but appreciably shorter than the femora, lateral margins appreciably lamellate distad, bearing six internal and eight external dentiform spines, the excavate dorsal surface broadening in the same direction caudal tarsi incomplete

General color prouts' brown, darkening to mummy brown on the genae, interocular portion of face, pleura and numerous small areas scattered over the pronotum and limbs, also lightened with many patches or sprinklings of ochraceous-buff to buckthorn brown on the pronotum, and particularly the crest and scapular area, limbs and abdomen The caudal femora show a rough grouping of three suboblique, transverse narrow pale bands, the abdomen shows both lateral and ventral series of pale dotting, while the ovipositor jaws are quite pale The vicinity of the highest arcuation of the humero-apical carinae of the pronotum shows several well contrasted quite dark patches Eyes very deep mars brown

Length of body, 11 3 mm , length of pronotum, 10, greatest width of pronotum across lateral lobes, 5 08, length of caudal femur, 7 3

The type of this striking and distinctive species is unique

Thymochares bolivari,[9] new species Plate 12, figs 8 and 9

The more evident differential features of this species have been given in the preceding key to the forms of the genus It is more nearly related to *T galeatus* than it is to *T crassipes*, but can at once be separated from the former by the far less marked cephalic production of the pronotal crest

Type — ♂ , Analamazotra, Great Eastern Forest, Madagascar November, 1930 (Olsoufeiff) [Hebard Collection, Type no. 1502]

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[9] In appreciation of the fundamental contributions of Dr. Ignacio Bolivar to our knowledge of the Acrydiinae

The following description is in part comparative with the preceding one of *T crassipes*

Size average (for the genus) form as a whole more like that of *galeatus* than of *crassipes,* lacking evident tegmina and wings surface much smoother than in *crassipes,* general surface micro-sculpture far weaker and much less evident than in latter

Head with width across genae slightly greater than that across eyes (as 7 to 6 2) seen from dorsum vertex at narrowest point is equal to but one-third the width across the eyes (as 2 2 to 6 3), except for the median carina not reaching as far cephalad as the most extreme point of the ocular rotundity, the marginal cingulation of the vertex in its general character and incompleteness as in the other species of the genus but its outline more flattened arcuate, median carina less definitely projecting, dorsal surface of occiput distinctly bifossulate, caudad limiting nodes more linear and more straight transverse than in *T crassipes*· seen in lateral aspect the occipital line is less distinctly ascending than in *crassipes,* the lesser production of the vertex giving to the fastigio-facial area a quite different profile from that seen in *crassipes,* the line from the highest point of the eyes, above which it is but narrowly visible, obliquely arcuate, conforming to the curvature of the eye outline, to the paired ocelli, the outline of the interantennal portion of the frontal costa more definite, more elevated and more regularly arcuate, to the median ocellus, than in *T crassipes* frontal costa in cephalic aspect narrower, more compressed and its lateral borders very faintly divergent ventrad, much less so than in *T crassipes,* greatest width of costa (ventrad) less than three-tenths of the interocular width of the vertex Antennae inserted between the lower fourths of the eyes, incomplete in type (and paratype) Eyes less trigonal in basal outline than in *T crassipes*, more bullate, outline more subspherical but the eyes are hardly more prominent when seen from dorsum, in lateral view greatest depth is to greatest width as 20 to 17

Pronotum with greatest width across caudo-lateral angles of the lateral lobes very slightly greater than one-half of pronotal length (as 5 8 to 11 2), width at the usual position of the humeral angles faintly greater than three-fifths the width across the lobes, in lateral view the greatest pronotal depth is equal to faintly more than seven-sixteenths of the pronotal length, caudal apex of pronotum acute, but distinctly less attenuate than in *crassipes* arcuation of median carina as in *T crassipes* but highest point of crest is but faintly cephalad of middle of pronotum cephalic margin of pronotum even more weakly obtuse-angulate produced over occiput than in *T crassipes,* the carina itself advanced very faintly more than the deplanate margin, pronotal carinae other than median of the general type seen in *crassipes* except that the anterior are subobsolete, the merest traces remaining, the humeral angles are indicated only by a fine carination, and the humero-apical carinae, while equally definite and similarly arcuate, are not adpressed sublamellate, as in *crassipes,* and join the lateral carinae appreciably caudad of the point where they fuse in that species, marking off a more evenly wide scapular area, the greatest width of which is little more than one-sixth the length of the area, this narrowing gradually in both directions: lateral lobes with sinus of caudal margin quite narrowly acute incised, the point of angle sharper than in *crassipes* and neither leading margin in any way arcuate. surface of dorsum of pronotum lacking the fossae of *crassipes*, regularly and quite smoothly tectate with a subobsolete rugulosity of both inclined surfaces, a single low rounded node-like tubercle placed on a line dorsad of the caudal coxae, surface of scapular field obscurely impresso-punctulate

No trace of tegmina or wings

Ultimate abdominal sternite (subgenital plate) strongly compressed, elongate, narrow, spout-like, the immediate apex narrowly fissate, the small lobes laterad of the same moderately acute, dorsal surface of lateral margins of sternite markedly deplanate, ventral surface of plate markedly carinate medio-longitudinally.

Cephalic and median femora similar to but more robust than in *crassipes*, the length equal to from three times (median) to three and one-half times (cephalic) in depth Caudal femora much more slender than in *crassipes*, agreeing in proportions with those found in *galeatus*, the greatest width but faintly more than one-third the length, dorsal carina much less elevated than in *crassipes*, in no way lamellate, dorso-external surface with twelve nodes, somewhat less decided and less deeply sculptured than in *crassipes*, pattern of pagina with seven oblique rugae with less pronounced asperities than in *crassipes*, ventro-external surface not at all canaliculate, obliquely deplanate, surface minutely shagreenous, ventral carina low arcuate caudal tibiae slightly shorter than the femora, marginal lamellations shallower than in *crassipes*, bearing six to seven spines on the margins, dorsal surface less excavate than in *crassipes* caudal tarsi with proximal article one and two-fifth length of distal

General color ranging from ochraceous-buff washed quite generally with mummy brown to dresden brown finely mottled with the darker color In the latter condition the pronotal crest, the humero-apical carinae, the dorsal and ventral caudal femoral carinae and the cephalic and median femora and tibiae in large part are checked or annulate with mummy brown on the base color, in the paler type this being less marked and entirely absent from the humero-apical carinae, ventro-lateral surface of the caudal femora quite solidly mummy brown and the pagina and dorso-lateral surface of the same may or may not be obliquely and irregularly trifasciate with mummy brown Eyes mars brown The type shows what is probably a Mendelian color phase in a strongly marked condition, possessing a nearly vertical but somewhat irregular narrow stripe of light ochraceous-buff which extends across the pronotum from immediately above the cephalic coxae to the dorsal crest very briefly cephalad of its highest point No trace of this is to be found in the other specimens examined.

Length of body, 9 4 mm , length of pronotum, 6 7, greatest width of pronotum across lateral lobes, 3 36, length of caudal femur, 5.45

In addition to the type I have before me a paratypic male bearing the same data as the type but taken in December, and an immature female, bearing the same data as the paratypic male The latter shows no noteworthy feature of difference from the type, and the immature female, which is in the instar preceding maturity, agrees with the adult males in every essential feature of the species

EXPLANATION OF PLATE 12

Fig. 1.—*Oxytettix cataphractus*, new species. Dorsal view of male (type). Analamazotra, Madagascar. (× 5.25.)

Fig. 2.—*Oxytettix cataphractus*, new species. Lateral view of male (type). Analamazotra, Madagascar. (× 4.5.)

Fig. 3.—*Procytettix hova*, new species. Dorsal view of male (type). Analamazotra, Madagascar. (× 5.25.)

Fig. 4.—*Procytettix hova*, new species. Lateral view of male (type). Analamazotra, Madagascar. (× 4.5.)

Fig. 5.—*Thymochares crassipes*, new species. Dorsal view of female (type). Analamazotra, Madagascar. (× 4.6.)

Fig. 6.—*Thymochares crassipes*, new species. Lateral view of female (type). Analamazotra, Madagascar. (× 4.6.)

Fig. 7.—*Thymochares crassipes*, new species. Face of female (type). Analamazotra, Madagascar. (Greatly enlarged.)

Fig. 8.—*Thymochares bolivari*, new species. Dorsal view of male (type). Analamazotra, Madagascar. (× 4.5.)

Fig. 9.—*Thymochares bolivari*, new species. Lateral view of male (type). Analamazotra, Madagascar. (× 4.5.)

FURTHER NOTES ON THE GENUS HEMIMERUS (DERMAPTERA, HEMIMERINA, HEMIMERIDAE)

BY JAMES A. G. REHN AND JOHN W. H. REHN

Since the appearance of our study of the interesting genus *Hemimerus*[1] we have had the opportunity to examine several additional lots of material representing four of the known species. One of these is of particular interest because it contains the previously undescribed male of *Hemimerus sessor*.

We wish at this time to acknowledge the help of Mr. Gordon Thompson of the British Museum of Natural History, Dr. Joseph Bequaert of the Harvard School of Tropical Medicine, and Messrs. Nathan Banks and Arthur Loveridge of the Museum of Comparative Zoology, who have either loaned us material or have supplied us with valuable information.

Furthermore, Dr. Joseph Bequaert has called our attention to the following two papers which were overlooked in our previous bibliography:

1911 BISCHOFF, Berliner Ent. Zeitschr., LVI, pp. (31)-(32). (A review of Heymons' paper and a comparison of the embryological development of *Hemimerus* with that of other insects, particularly some Diptera.)

1931 SCHOUTEDEN, Bull. Cercle Zool. Congolais, VII, fasc. 2, p. 30. [In Rev. Zool. Bot. Afr., XX, fasc. 2, p. 30.] (Notes on insects of the Belgian Congo, mentioning *Hemimerus talpoides*.)

In the course of the present work it was thought that it would be helpful if the information concerning the host association of these ectoparasites was briefly summarized.

Practically all of the species of the genus *Hemimerus* have been recorded from *Cricetomys gambianus*, which is the oldest known species of that genus. It is our belief that the host determinations have, in many cases, been either field identifications or were made without a careful study of the closely related forms, because as far as it is possible to ascertain at the present time the only *Hemimerus* found on *Cricetomys g. gambianus* is *H. talpoides*. It is to be regretted that in many cases the host has not been identified, and as a result there are numerous references in the literature to various species of *Hemimerus* which give the host as *Cricetomys* sp.

The known hosts of *Hemimerus hanseni* are *Cricetomys emini*, with its two races *C. emini emini* and *C. emini proparator*, and *C. gambianus elgonis*. It has been recorded likewise from *C. gambianus*, presumably *C. g. gambianus*, but it is our belief that these identifications may be incorrect, or inexact.

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[1] Rehn and Rehn. A study of the Genus Hemimerus. Proc. Acad. Nat. Sci. Phila., LXXXVII, pp. 457-508, (1936).

The type and only known specimens of *H vicinus* are said to be from *Cricetomys emini*. We doubt the validity of this identification, since it seems more likely that this specimen was taken from one of the other forms of *Cricetomys* that have been described from Nigeria, possibly a member of the *gambianus* complex

Information concerning the hosts of *H vosseleri* is very meager, the only definite record being from *Cricetomys gambianus enguvi* As is the case with many of these ectoparasites, its host has also been said to be *Cricetomys gambianus* without further comment as to subspecies

The hosts of *Hemimerus sessor* are *Cricetomys gambianus raineyi*, *C gambianus elgonis* and *C emini*, the latter two being recorded for the first time in the present paper. We believe that the identification of *C emini* was probably made in the field or without the presence of other material for comparison, and that a subsequent study of the material will show it to be a member of the *gambianus* complex

The only record of a specific host for *Hemimerus deceptus* is of *Cricetomys gambianus haagneri*.

The genotype, *H talpoides* has been recorded numerous times from *Cricetomys gambianus* The sole record of this species from under rotting wood in Liberia may be explained by its dropping from the host, or by its leaving the cooling body of a *Cricetomys*.

For *H bouvieri* we have very little definite information, the only record being from *Cricetomys emini* which might be considered as a somewhat doubtful identification

The only known host of *Hemimerus advectus* is *Cricetomys ansorgei*

This constitutes all the known information concerning the hosts of these interesting ectoparasites, and while it is not extensive, we hope that in the future it may be possible to secure more information of this character with definitely correlated material of the host for critical determination

In our previous characterization of the Hanseni Group we said that the female sex was not capable of locking the anal orifice, but, as a result of the examination of more material, we find that the female is able to close the anal orifice in much the same manner as are members of the Talpoides Group The closing, however, is not as complete, nor as readily accomplished, as in the members of that more specialised group

Hemimerus hanseni Sharp

1895 *Hemimerus hanseni* Sharp, Cambr Nat Hist., V, p 218, figs 114-116

We have examined two additional lots of this widespread species and in these rather large series there is no important variation other than that which has previously been noted.

It is our desire to correct some of the information given in our previous paper We recorded *Cricetomys emini* as the host of the material from

Kaimosi, Kakamega, Kenya Colony, while this should have been *Cricetomys gambianus elgonis* We wish to thank Mr Arthur Loveridge for bringing this to our attention

In a footnote we previously expressed our belief that Lulenga, Kivu, was given in error by Dr Chopard for Lubango However, Dr J Bequaert, in a recent letter, has informed us that Lulenga is a "well-known Mission of the White Fathers, in 1°25′ S, 29°20′ E, a few miles north of Burunga"

Specimens examined (additional to previously reported series) —72, 24 ♀, 16 ♂, 32 juv

Jinja, Uganda, 1934, ("off *Cricetomys*"), 13 ♀, 11 ♂, 16 juv ♀, 7 juv ♂, [B M N H]

Kampala, Uganda, February 14, 1934, (G H E Hopkins, "off *Cricetomys emini proparator*"), 11 ♀, 5 ♂, 8 juv ♀, 1 juv ♂, [B M N H]

Hemimerus vicinus Rehn and Rehn

1936 *Hemimerus vicinus* Rehn and Rehn, Proc Acad Nat Sci, LXXXVII, p 481, figs 2, 11 and 19 [♀, Ife, Nigeria]

We have had the opportunity to examine two additional females of this species, which apparently were taken with the type These specimens agree in all essential respects with the type

Specimens examined (in addition to type) —2 ♀

Ife, Nigeria, October 1926, (A S Pearse, "*Cricetomys emini*"), 2 ♀, [U S.N M]

Hemimerus sessor Rehn and Rehn Figs 1 to 4

1936 *Hemimerus sessor* Rehn and Rehn, Proc Acad Nat Sci Phila, LXXXVII, p 487, figs 3, 12 and 23 [♀, Mount Gargues, Kenya Colony]

The previously unknown male of *sessor* is most closely related to *vosseleri* and *deceptus*, being in most characteristics practically intermediate between these two forms As is the case with the other members of the Talpoides Group the process of the ultimate sternite is directed sinistrad, while in the males of the Hanseni and Advectus Groups[2] this process points dextrad In common with both *vosseleri* and *deceptus* the male of *sessor* has the ultimate tergite transverse From both of these forms *sessor* differs by having the ultimate tergite with its greatest length equal to one-third of the proximal or slightly more than one-half of the apical width The process of the ultimate sternite has its dorsal margin almost evenly arcuate when seen in profile, being but slightly flattened near its base, instead of being evenly arcuate (*vosseleri*) or with a dorsal lobe in its distal portion (*deceptus*), the proximal shoulder of this process is more pronounced than in *vosseleri* and its ventral margin is more concave in its distal portion than is the case in that form The whole process of the ultimate sternite is quite different from that found in *deceptus*

[2] The male of *vicinus*, the only member of the Vicinus Group, is as yet unknown

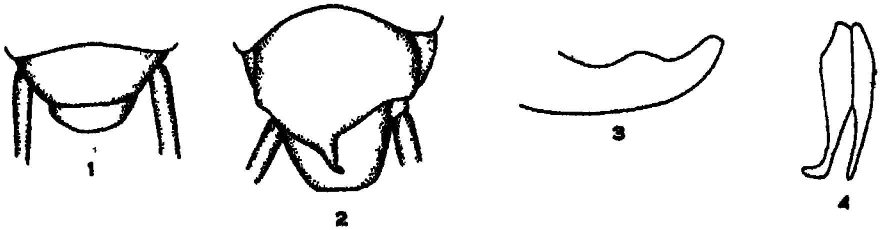
Allotype.—♂, Koich, Gulu District, Uganda May 27, 1936 (A. M. Gwynor, " off *Cricetomys emini* ") [British Museum of Natural History.]

The male of this species, as is the case with all the other forms of the genus, differs from the female solely in features of the terminal abdominal segments

Penultimate tergite broadly transverse, roughly symmetrically trapeziform, greatest width (proximal) equal to approximately two and one-half times greatest length, lateral margins evenly and obliquely convergent caudad, roundly passing into the subtruncate distal margin, this subtruncate portion being equal to slightly more than two-thirds of the proximal width, or slightly less than twice the greatest length In lateral aspect the dorsal lines of the penultimate and ultimate tergites are seen to be in practically the same plane, which is declivent distad

Ultimate tergite, when viewed from the dorsum, strongly transverse, greatest length equal to one-third proximal or slightly more than one-half apical width, lateral margins evenly and obliquely convergent caudad, roundly passing into the weakly rounded distal section[3]

Ultimate sternite slightly asymmetrical, but as a whole trigonally produced, greatest length, exclusive of median process, equal to slightly more than three-fourths the greatest width, which is slightly proximad of the base of the produced area, sinistral margin almost straight, dextral weakly and obliquely bisinuate, both portions converging slightly dextrad of the median line to form the process which is directed slightly sinistrad, the production is curved ventro-sinistrad, peduncle quite short, ovate in section, portion of process distad of peduncle compressed, immediate apex narrowly rounded, its ventral outline distad of proximal shoulder distinctly concave, dorsal margin flattened in basal half, evenly arcuate in distal portion, its length, in lateral aspect, equal to slightly less than one-fifth of the greatest width of the sternite



Figures 1-4 *Hemimerus sessor* Rehn and Rehn, ♂ (*allotype*) Koich, Gulu District, Uganda (All greatly enlarged) 1 Dorsal view of apex of abdomen 2 Ventral view of apex of abdomen 3 Lateral outline of process of ultimate sternite 4 Outline of parameres

Cerci as in all the other members of the genus.

Parameres· see Figure 4

Variation—The only variation observed in the males of this species has already been noted under the description of the allotype.

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[3] *In the allotype and in one of the only other two known males of this species the distal margin of the ultimate tergite seems somewhat deformed. In the allotype this margin is slightly flattened in the dextral half, while in another male this margin*

The only significant variation observed in the females here examined is in the ventral surface of the ultimate tergite which is usually deplanate but occasionally may be weakly convex. Some of the females before us show a portion of the area between the actual margin and the submarginal carina of the ultimate sternite broken away, this is in all probability due to damage while in copula.

Distribution.—This species, which was originally known only from Mount Gargues, Kenya Colony, is now seen to occur in portions of Uganda (Mount Elgon area and Koich and Daga, Alero in the Gulu District).

Host association.—The original material of this species was found on *Cricetomys gambianus raineyi*, while the material here recorded is stated to be from *Cricetomys gambianus elgonis* and *C. emini* (vide supra).

Specimens examined (at this time).—34, 17 ♀, 3 ♂, 5 juv. ♀, 4 juv. ♂, 5 juv. sex uncertain.

Sipi, Mt. Elgon, Uganda, December 18, (A. Loveridge, "from *Cricetomys gambianus elgonis*"), 1 ♀, [M.C.Z.].

Koich, Gulu District, Uganda, May 27, 1936, (A. M. Gwynor, "off *Cricetomys emini*"), 5 ♀, 1 ♂ (*allotype*), 2 juv. ♂, 5 juv. sex uncertain, [B.M.N.H.].

Daga, Alero, Gulu District, Uganda, April 21, 1936, (H. G. E. Hopkins, "off *Cricetomys emini*"), 11 ♀, 2 ♂, 5 juv. ♀, [B.M.N.H.].

Hemimerus talpoides Walker

1871. *Hemimerus talpoides* Walker, Catal. Derm. Salt. Brit. Mus. V Suppl. p. 2.

We have had the privilege of examining two additional lots of material of this species, and with the exception of a single male they agree in all essential respects with our previous characterization of the species. This one male, from Kissy, Sierra Leone, has the median portion of the distal margin of the penultimate tergite slightly produced, instead of being truncate. In this same lot of material there was one female which had a portion of the margin of the ultimate sternite broken off.

Specimens examined (at this time).—45, 16 ♀, 3 ♂, 13 juv. ♀, 13 juv. ♂.

Kissy, Sierra Leone, February 1, 1936, ("off *Cricetomys gambianus*"), 10 ♀, 2 ♂, 5 juv. ♀, 5 juv. ♂, [G. B. Thompson Collection].

Sierra Leone, ("off *Cricetomys gambianus*"), 6 ♀, 1 ♂, 8 juv. ♀, 8 juv. ♂, [B.M.N.H.].

appears weakly bilobate. But from an examination of the only specimen that has this margin perfect we are able to say that under normal conditions this margin would be weakly rounded. This specimen, which is more perfect in this respect, was not chosen as allotype because of other damages. The claws of the host rats are apparently responsible for a high percentage of damaged tergites in the Hemimeri which we have studied. Occasionally a tergite is completely cracked longitudinally but the injury in all cases, although evident, had healed and the parts were fully fused.

ON A NEW SPECIES OF DRONGO FROM SIAM

BY RODOLPHE MEYER DE SCHAUENSEE

Included in the collections of birds which from time to time have been arriving at the Academy from Siam are three specimens of a new species of drongo.

I propose to name it for my friend, James Bond, an ardent student of West Indian birds.

Dicrurus bondi, n. sp.

It is a gray drongo, best characterized by its small size, short tail, and complete absence of black on the forehead.

From *Dicrurus leucophaeus mouhoti,* the resident gray drongo of the district in which *bondi* was collected, it differs in its very much paler coloration both above and below, absence of black on the forehead, pale gray instead of black outer webs on the outer tail feathers and dusky brownish instead of black primaries. In *bondi* the lower belly and under tail coverts are paler than the rest of the under parts, while in *mouhoti* they are of the same color.

From *Dicrurus leucophaeus leucogenys* (found in winter with *Dicrurus bondi*), *Dicrurus bondi* differs in being darker both above and below, in having no white on the sides of the head or lores, no black on the forehead, the primaries entirely dusky brownish instead of pale gray with the distal third black.

Eight specimens of *D. leucophaeus leucogenys* from eastern Siam measure:

Wing	Tail	Culmen[1]
♂ 148 mm.	146 mm.	17.5 mm.
♂ 140.5 mm.	135 mm.	17 mm.
♂ 145.5 mm.	142.5 mm.	16.5 mm.
♂ 139 mm.	133 mm.	16 mm.
♂ 146 mm.	142 mm.	17.5 mm.
♂ 139 mm.	133 mm.	16.5 mm.
♀ 138 mm.	137.5 mm.	17 mm.
♀ 135.5 mm.	140 mm.	16 mm.

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[1] Measured from the anterior edge of the nostril.

Seven specimens of *Dicrurus leucophaeus mouhoti* from eastern Siam measure

Wing	Tail	Culmen [2]
♂ 146 mm	152 mm	18 mm
♂ 144 mm	149 mm	17 mm.
♂ 144 mm	157 mm	18 mm
♀ 142 mm	149 mm	18 mm
♂ 142 5 mm	147 5 mm	18 mm.
♀ 140 mm	147 5 mm	18 mm
♂ 143 mm	146 mm	18 mm
♀ 139 mm	140 mm	18 mm

Three specimens of *Dicrurus bondi* measure

Wing	Tail	Culmen [3]
♂ 132 mm	123 5 mm	15 mm
♂ 125 mm	113 5 mm	15 5 mm
♂ 131 mm	121 mm	15 5 mm

The above three specimens of *Dicrurus bondi* were collected at Ubol-Khulu and Ubol-Chanuman just north of Ubol and south of Khemrat near the Mekong River (Lat 15°N , Long 115°E) All three birds are fully adult.

Type —Adult male, No 127391 in the collection of The Academy of Natural Sciences of Philadelphia, collected by Lucas Bah on January 7, 1936, at Ubol-Chanuman, eastern Siam

Measurements —Total length, 245 mm , Wing, 132 mm , Tail, 123 5 mm , Culmen, 15 mm

In a general way this new drongo is reminiscent of *Dicrurus l leucophaeus* of Java *Bondi*, however, is a very much paler bird both above and below, has less sheen on the upper parts, and has the outer remiges pale gray instead of black It is rather surprising to find another species of gray drongo in Siam It is probable that it breeds somewhere in China and is but a winter visitor to Siam

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[2] [3] Measured from the anterior edge of the nostril

FIRST PRELIMINARY REPORT ON THE RESULTS OF THE SECOND DOLAN EXPEDITION TO WEST CHINA AND TIBET.

TWO NEW BIRDS FROM TIBET

BY RODOLPHE MEYER DE SCHAUENSEE

Among the birds secured on the Second Dolan Expedition the following two appear to belong to undescribed races

The first is a new race of *Crossoptilon crossoptilon* for which I propose the name of

Crossoptilon crossoptilon dolani, subsp nov

This new Eared Pheasant is a most interesting one It is the link between *C c crossoptilon* (Hodgs) and *C c harmani*, Elwes In fact it is really an exceedingly pale replica of *harmani* A series of eight birds was secured, three males and four females at Jyekundo on May 19th and an additional female on June 8th, 1935, about three days march due north of Jyekundo, on the Yalung river

The adult male which I have selected as the type has the same color pattern as *harmani* except that the back of neck is not darker than the mantle

The description of the bird as compared to *harmani* is as follows

Top of the head black Chin, throat, fore neck, " ears ", a bar separating the black cap from the gray of the neck, and the belly, white as in *harmani*

Entire upper parts, including the hind neck, pale ash-gray, very much the color of the lower back of *harmani* Tail, with twenty feathers, similar to that of *harmani*, except that the central pair has a less purple, more green sheen, and the webbing is rather more decomposed

Primaries dusky brown, the outer web pale gray, instead of both webs dusky brown as in *harmani* Exposed parts of the secondaries pale blue gray, not dark gray with a bluish purple sheen as in *harmani*

Chest and sides of body pale gray slightly paler than the upper parts Flanks pale gray, the feathers very decomposed and hair like, white at the tips Thighs ash-gray instead of dark brownish gray as in *harmani* Under tail coverts very hair like and ash-gray, instead of blackish gray

The feathers of the upper parts are very rough to the touch, instead of smooth and rather silky, and in this respect *C c dolani* differs from *harmani* and all other races and species of *Crossoptilon*

The measurements are as follows· Wing 328 mm Culmen 36 5 mm Tail 388 mm. Tarsus 93.5 mm

Type, A N S.P No 126350, adult male, collected at Jyekundo, S Kokonor, (33° N , 96° 45′ E) on May 19th, 1935 by Ernst Schäfer

Material examined. *Crossoptilon c crossoptilon*, eight specimens; *C. c harmani*, one specimen, *C c. drouyini*, one specimen; *C c. dolani*, eight specimens.

The series of *C c dolani* is fairly uniform The gray on the hind neck in two females is not as definite as in the rest of the series, nor in the gray on the under parts of the two birds as dark as in the rest One is from Jyekundo and the other is the female collected on June 8

In one female from Jyekundo the inner web of the next to the outermost tail feather has a narrow streak of white

I take great pleasure in naming this new pheasant for Brooke Dolan II, leader of two expeditions to Tibet and Szechwan

I am much indebted to the American Museum of Natural History for kindly lending me the specimen of *C c harmani*

The second new bird is a plover which may be known as

Charadrius mongolus schäferi, subsp nov

Adult in breeding plumage

Similar to *C m atrifrons* Wagler, but darker above The orange-rufous pectoral band much darker and more definite, in this respect similar to *C m mongolus* Pallas

Type, A N S P No 126220 collected by Ernst Schafer at Camp 104, a locality about 100 miles due north of Jyekundo, S Kokonor, June 13th, 1935

Measurements wing 128 mm , tail 50 mm , culmen 19 mm , tarsus 34 mm

Material examined C m schaferi

Camp 104, June 13th, 1935, 10 adult males, 5 adult females, four unsexed birds and two fledglings

C m atrifrons Seven adult males taken at the following localities Tian-Shan, June 24th, Turkestan, April 9th, Northern Tibet, June, Dasch-Kul, Tibet, June, N Tibet, May, Nan Shan Mts , June, Zeyla Somaliland, April One female from Kokonor Lake, June

As the type of *atrifrons* is from Bengal, and evidently a migrant bird, the name *atrifrons* is hereby restricted to the breeding population of Kokonor lake region

Charadrius m mongolus Four males and a female from Foochow, China taken during April and May, a female from the Riu Kiu Islands, collected in June, three males from Japan, May and September, and three males from the Behring Islands taken at the end of May

Dr Wetmore has very kindly lent me the type of *C pamirensis* described by Richmond from Tagdumbash, Pamir, E Turkestan. This bird has nothing whatever to do with *C m schaferi* It is a pale bird, fitting well into the series of *C m atrifrons* of which it probably is a synonym

The females of this new race differ from *mongolus* and *atrifrons* in the same way as do the males

I am much indebted to the Museum of Comparative Zoology, the American Museum of Natural History, and the United States National Museum, for lending me comparative material

This new bird is named in honor of Ernst Schäfer, its collector.

SECOND PRELIMINARY REPORT ON THE RESULTS OF THE SECOND DOLAN EXPEDITION TO WEST CHINA AND TIBET: A NEW RACE OF OCHOTONA

By Glover M Allen

In studying the mammals brought back by the Second Dolan Tibetan Expedition, 1934–1935, a well-marked race of *Ochotona erythrotis*, which responds to the more arid conditions in its paler hues, was found, and is named in honor of the organizer and leader of the expedition

Ochotona erythrotis brookei, new subspecies

Type An adult male, skin and skull, no 17606, Acad Nat Sciences, Philadelphia, from Camp 74, a few miles northwest of Jyckundo, Kham, Tibet Collected April 14, 1935, by Ernst Schafer, of the Second Dolan Tibetan Expedition Original No 2213

Description A pale member of the *erythrotis* group, with the sides of the head remaining gray instead of rusty in the summer pelage

The type and a series of eight additional adults from the same locality, are practically indistinguishable from others obtained on the northeast border of Tibet, along the uppermost of the Yellow River gorges They are noticeably paler than the series representing the winter pelage of *Ochotona e gloveri*, with much less of the blackish tipping to the hairs, and with paler, nearly white, instead of distinctly buffy subterminal bands The tip of the nose and the backs of the ears (including the proectote) are pale orange rufous, as is also the outer part of the metentote A suggestion of the same pale orange extends back from the muzzle to between the eyes, sides of the head distinctly grayish, minutely peppered with black, a conspicuous tuft of long white hairs at the inner base of the ear partly covering the opening, sides paling into the grayish white of the belly, the hairs throughout with deep slaty bases Backs of the feet white, the soles thickly haired except the small black pad under the tip of each toe There is a small patch of rufous on the back of each ankle, including the heel The nape is whitish

The summer pelage differs from that of typical *erythrotis*, of which specimens from Kansu may be taken as representative, in the much more restricted development of the red on head and body A series of seventeen old and young taken in early August at or near the type locality, is slightly darker across the back but otherwise chiefly differs in the deeper, more rufous color of the nose and ears, and in having this color extended from the end of the muzzle back between the eyes to the bases of the ears. The sides of the head from the vibrissae to and including the cheeks remain dark gray, due to the mixture of whitish hairs with minute black tips. In comparison with typical *erythrotis* of Kansu, the rufous of the summer coat is thus of very slight extent, instead of covering the whole head and more or less of the back. Compared with summer skins of *gloveri*, in which a similar restriction of red takes place, the rufous area is much clearer and brighter and the rest of the dorsal coloring is paler.

The skull is of the group in which the incisive foramina are confluent with the anterior palatal foramina, forming thus a long triangular opening, narrowed at the front end. The orbit is rather longer than wide and the upper profile of the skull is evenly convex.

Measurements. No measurements of fresh specimens are available. In the type specimen, the hind foot with claw measures 36 mm. Its skull, though imperfect in the basicranial region, measures: greatest length from occiput to front of incisors, 51 mm., palatal length, 20.5, palatal bridge, 2.0; length of anterior palatal foramina, 16, zygomatic width, 24.1, width of brain case, 19.6, width outside molars, 15, upper cheek teeth, 9.2, lower cheek teeth, 8.6, diameters of orbit, 13.8 x 10.5.

This is a pallid race of the eastern Tibetan plateau, contrasting with the darker subspecies *gloveri* of the extreme western border of Szechwan. It is interesting that both agree in the restriction of the bright rufous in summer pelage, to the nose, forehead and ears, whereas in the more northern typical race, as figured and described by Buchner, the entire head including the cheeks, and the sides of the neck are rufous, with a wash of the same over the back.

While the specimens taken in mid-April near Camp 74 are still in full winter pelage, one taken slightly to the northwest, at Camp 76, on June 8, is beginning to change to summer coat. In this specimen the rufous of the nose extends back between the eyes posterior to which is a line where hair is being lost. Another individual of the same date has about completed the change, while a series from Jyekundo, August 4, is in fully developed summer coat.

STUDIES ON THE FAMILY ACRIDIDAE (ORTHOPTERA) OF VENEZUELA

BY H RADCLYFFE ROBERTS

The material here studied is largely the result of incidental collecting by specialists of other fields, but it became quite apparent that many new forms and interesting records were represented in the collections Five hundred and eighty-six specimens representing 51 species of the family Acrididae are recorded and include five genera and ten species now described as new to science With the exception of a small paper by Ignacio Bolivar (see below), there has been no report on the Orthoptera of Venezuela, and it is hoped that the present paper will give a suggestion of the richness of the fauna and the interesting work yet to be carried on in this region

Though a political unit, Venezuela embraces a number of very distinct faunistic areas These areas are well discussed by H B Baker and H Pittier[1] We have material represented from the following general regions the eastern branch of the Andes, known as the Sierra de Merida, the Coast Range or Carribean System back of Puerto Cabello, the Orinoco Delta and along the Coast of the Gulf of Paria, part of the savanna and forest region in the vicinity of the Caura River of the Orinoco System, and lastly the islands off the coast, especially the Dutch West Indies[2] Many of these regions have their nearest biotic affinities beyond the borders of the country rather than between each other, as for example the close relationship of the Delta Region to the Guianas, and the Sierra de Merida to the other portions of the Andes Of much interest is the fact that several of the species obtained from the savanna country of the Orinoco basin are the same or closely related to species only known previously from southern Brazil or Argentina, especially when we consider that these two great savanna regions are apparently so widely separated From the higher elevations of the Andes the most striking and distinctive new forms were found Further collecting in this region and other portions of the Andes is greatly needed and should bring to light an abundance of new forms

LITERATURE

Many scattered references on Venezuela are to be found in the older literature where new species are described from all over the Neotropical Region, but, as mentioned above, Bolivar's short paper is the only contribution entirely on Venezuela Orthoptera Of much value, however, are a number of more recent studies dealing with other regions of northern South America and the West Indies that are of considerable help to the student working on this region. A few of the more important references follow

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[1] Shelford, A Naturalist's Guide to the Americas, pp 637-648, 1926

[2] We realise that these latter islands are not a political part of Venezuela, but on the other hand they are better included here than in any West Indian study

Bolivar, Ann Soc Ent France, (6), X, pp 137-146, 1890

Bruner, Orthoptera of Trinidad, Journ N Y Ent Soc, XIV, pp 135-165, 1906

Hebard, Dermaptera and Orthoptera of Colombia, Trans Amer Ent Soc, XLIX, pp 165-313, 1923

Hebard, Acrididae of Panama, Trans Amer Ent Soc, L, pp 75-140, 1924

Hebard, Dermaptera and Orthoptera of Ecuador, Proc Acad Nat Sci Phila, LXXVI, pp 109-248, 1924

COLLECTING LOCALITIES

In recording the specimens studied, the name of the collector and the collection to which it belonged was omitted to avoid much repetition A list of most of the localities is given below with as full data as available The maps of Venezuela made use of in this study are a series of most of the states published in Caracas from 1916 to 1920 and edited by Vicente Lecuna I am indebted to Mr M A Carriker, Jr for giving me additional notes as to the type of country encountered at his collecting localities which are included below

Data on collecting localities of M A Carriker, Jr with notes to which collection the material belongs

San Esteban, Estado Carabobo, Distrito Puerto Cabello (about 5 miles south of Puerto Cabello) Elevation 500 ft up stream valley with forest and coffee October and November 1910 [A N S P Coll]

Las Quiguas, Estado Carabobo, Distrito Puerto Cabello (further up same valley as San Estaben) Elevation 2000 ft September 1910 [A N S P Coll]

Aroa, Estado Yaracuy, Distrito Bolivar Elevation less than 1000 ft Mountainous country with humid forest December 1910 [A N S P Coll]

Santa Elena, Estado Merida Elevation 200 ft, humid forest (Can not locate on map, but is near the south end of Lake Maracaibo in the foothills of the Andes) August 1922 [Hebard Coll]

Guamito, Estado Trujillo Elevation between 4-5000 ft Semi-dry forest, mostly second growth (Locality not located on map, but it is south of Trujillo) May 16-20, 1922 [Hebard Coll.]

Sabana de Mendoza, Estado Trujillo (On railroad between Trujillo and coast) Almost sea level in dry savanna country with scattered scrubby woodland April 28 to May 3, 1922 [Hebard Coll]

Paramo de Rosas, on boundary between Estado Trujillo and Estado Lara, Distrito Tocuyo (Between Anzoategui and Carache on road from Tocuyo to Trujillo) Upper edge of timber line of the lower paramo Elevation 10,400 ft March 1911 [A N S P Coll.]

Anzoategui, Estado Lara, Distrito Tucuyo (South of Tocuyo) Elevation 6000 ft Subtropical forest country May 16–20, 1911 [A N.S P Coll]

La Teta de Niquitao, Estado Trujillo, Cordillera de Merida (25 km south of Trujillo) Elevation 10,000 ft June 1, 1922 [Hebard Coll]

Maripa, Rio Caura, Estado Bolivar Upper edge of savanna region, a good distance up Rio Caura Elevation less than 500 ft October 1909 [A N S P Coll]

Rio Mato, Estado Bolivar (Branch to the right of the Rio Caura above Maripa) Continuous humid forest October and November 1909 [A N S P Coll]

Ciudad Bolivar, Estado Bolivar Low savanna country little above sea level September 1909 [A N S P Coll]

Rio Orinoco near San Felix, Estado Bolivar (Just above head of delta) Much low vegetation, transition forest and savanna September 15, 1909 [A N S P Coll]

The following localities are those of the Francis E Bond Expedition on which Mr Stewardson Brown was this Academy's representative, and collected the orthopteran material A brief account of the itinerary of the expedition is contained in Dr Witmer Stone's report on the birds (Proc Acad Nat Sci Phila , LXV, pp 182–212, 1913).

Cariaquito, Estado Sucre, Distrito Mariño (Peninsula of Paria on south shore near Trinidad, B W I) January and March 15, 1911

La Piedrita, Estado Monagas, Distrito Sotillo (On the Uracoa River) February 16, 1911

Caño Vagre, Estado Monagas, Distrito Maturin (Close to the mouth of the Caño Manamo) January 28, 1911

Guinapa River, Estado Monagas, Distrito Maturin February 1911

Buelta Triste, Estado Monagas, Distrito Sotillo (On the Caño Manimo near mouth of the Uracoa Locality not found on map) February 20, 1911

The following localities are those at which Dr H Burrington Baker collected orthopteran material in the Dutch West Indies A rather complete account of the islands is contained in his paper on the mollusks of the region (Occ Papers Mus Zool , Univ Michigan, no 152, August 1924) The Orthoptera were collected for cytological purposes and are in part at this Academy and at the University of Pennsylvania Zoological Laboratory

Williamstadt, Curaçoa, D W I June 17, 1922

Campo Knip, Curaçoa, D W I July 2-8, 1922

Aruba, D W I July 22–28, 1922

Oranjestadt, Aruba, D.W I July 28, 1922

Other localities, when mentioned in the text, but not listed above, include the collector's name and the collection to which the material belongs

I wish to take this opportunity to thank the Academy of Natural Sciences of Philadelphia and Mr Morgan Hebard for the privilege of reporting on their collections, and also to the Cornell University, the Paris Museum, and the Carnegie Museum for the loan of a small amount of material for determination or comparative purposes To Mr Hebard and Mr J A. G. Rehn it is with great pleasure that I acknowledge my gratitude for their most generous advice and encouragement during the studies and preparation of this paper

Family ACRIDIDAE

Subfamily ACRYDIINAE

Tylotettix pygmaeus, *new species* *Text-plate, figures 1 and 2*

Two species of this genus have been previously known *T sinuatus* Morse 1900 from Nicaragua, and *T simplex* Hebard 1924 from Panama This new species based on a single female resembles more closely the Nicaragua and not the Panama species contrary to what might be expected The Panama species is readily distinguished by having the pronotum relatively longer, extending to near or slightly beyond the apices of the hind femora, and its apex is rather acute, whereas in *T. pygmaeus* the apex extends just beyond the ovipositor valves or barely reaches the proximal portion of the genicular lobes of the hind femora, and also the apex is subtruncate, the lateral margins not tapering to a rather acute apex *T sinuatus* is somewhat intermediate in the above respects The fastigio-facial carina is produced strongly cephalad to a similar degree in *T pygmaeus* and *T sinuatus* and to a much less degree in *T simplex* The scutellum of the frontal costa between the carinal forks is almost twice as wide in *T sinuatus* as in *T simplex,* whereas *T pygmaeus* is rather intermediate in this respect

Type —♀, San Esteban, Venezuela November 1910 (M A Carriker, Jr) [Acad Nat Sci Phila, Type no 5564]

Size small, the smallest of the genus and very robust Dorsal and lateral surfaces very irregular and rugose Lateral carinae of vertex slightly projecting beyond the eyes, fastigio-facial carina strongly produced as in *T. sinuatus*, carinal forks of frontal costa divergent to just above the bases of the antennae and from thence ventrad running parallel. Pronotum moderately tectiform, median carina percurrent, arched and weakly cristate cephalad of shoulders, slightly arched caudad, cephalic margin very broadly obtuse angulate; disk rather strongly rugulose, tapering caudad to its subtruncate apex, which barely extends as far as the genicular lobes of the hind femora, inferior caudal angles of lateral lobes of pronotum moderately slanting outward, and form a sharp obtuse angle in dorsal aspect; tegminal sinus and tegmina absent,[3] the anterior portion of the scapular area extends ventrad to a much greater degree than in *T sinuatus* and *T simplex* Caudal femora much as in the other two species, but relatively shorter and more robust

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[3] This is the case in all members of this genus Hebard in describing *T simplex* should have stated that the tegminal sinus was lacking instead of the scapular area which of course is well developed

Coloration Dark earthy brown

Measurements Length of body 7 8, length of pronotum 6 8, width between apices of angles of pronotal lobes 3 2, length of caudal femur 4 1 mm

Amorphopus antennatus Bolivar

There is a specimen in the A N S P Coll, a female from Venezuela, recorded by Rehn[4]

Allotettix peruvianus (Bolivar)

1887 *P[aratettix] peruvianus* Bolivar, Ann Soc Ent Belgique, XXXI, p 272 [♂, ♀, Pumamarca, Peru]

1890 *P[aratettix] simoni* Bolivar, Ann Soc Ent France, October, p 138 [♂, ♀, Colonie Tovar, Venezuela]

Guamito, Trujillo, Los Andes, V, 16–20, 1922, 1 ♀

This specimen has the abbreviate pronotum, extending but slightly beyond the apices of the caudal femora Though most of the specimens examined from Colombia and Peru are of the elongate type, there are a few from Callanga, Peru, and Cincinnati and Vista Nieve, Santa Marta, Colombia, recorded by Hebard[5] as *A peruvianus* of the abbreviate type Comparing the Venezuela specimen with the others, the vertex is unusually broad but we have a specimen from Vista Nieve, Santa Marta, Colombia that is equally broad Incidentally this abbreviate form usually has the median carina of the pronotum quite sinuate and also the lateral margins of the median femora become more sinuate, as compared with the elongate type

Bolivar described *P simoni* from Colonie Tovar, Venezuela which I assume to be the same as Tovar shown on maps to the west of Merida in the Venezuelan Andes Though I have not seen the type, I can not find any satisfactory character to separate it from *A peruvianus* from his description of the species, and as the specimen considered above, which comes from the same general Andean region, is not separable from the abbreviate phase of *A peruvianus*, Bolivar's *Paratettix simoni* is best considered a synonym of *A peruvianus*

Allotettix cayennensis (Bolivar)

1887 *P[aratettix] cayennensis* Bolivar, Ann Soc Ent Belgique XXXI, pp 187, 270, 273 [Cayenne]

1906 *Allotettix chipmani* Bruner, Journ New York Ent Soc, XIV, p 146 [Trinidad]

Although no specimens have been recorded from Venezuela of this species, it is quite apparent that it will be found in the Northeast portions of Venezuela

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[4] Proc. Acad Nat Sci Phila, p 664, 1904.

[5] Hebard, Trans Amer Ent. Soc, XLIX, p 168, 1923

Upon comparing Bruner's paratypes, in addition to other material from Trinidad, with material from French Guiana, and also series from British Guiana, there appears to be no character to separate them and therefore Bruner's species must be considered a synonym

A cayennensis may be distinguished from *A peruvianus*, a closely related species from the Andean regions, by averaging decidedly smaller, the fastigial carina projects beyond the anterior lateral margins of the vertex and usually projects beyond the eyes from lateral aspect, the median femora are not as elongate and the lateral margins are more sinuate

Micronotus caudatus (Saussure)

There is before me a good series belonging to the Paris Museum labelled Venezuela, Coll A Finot, 1908, and also one female from Valencia, Venezuela from the Hebard collection This material agrees closely with a series from the Guianas, the type locality

Paratettix antennatus Hebard

1923 *Paratettix antennatus* Hebard, Trans Amer Ent Soc, XLIX, p 169 [Andagoya, Antioquia (Choco), Colombia]

San Esteban, X–XI, 1910, 2 ♀ Las Quiguas, IX, 1910, 1 ♀

These three females have the abbreviate form of the pronotum

EUMASTACINAE

Eumastax surinama Burr

Las Quiguas, IX, 1910, 7 ♂, 12 ♀, 2 juv San Esteban, XI, 1910, 15 ♂, 11 ♀, 3 juv Aroa, XII, 1910, 1 ♂, 2 ♀, 1 juv

I have seen no topotypical material from Surinam, or any of the Guianas, but the above agree closely with the description and figure

PROSCOPINAE

Prosarthria teretrirostris, Brunner

Sabana Mendoza, Los Andes, IV, 28 to V, 3, 1922, 1 ♀ juv

ACRIDINAE

Amblytropidia trinitatis Bruner

Maripa, Rio Caura, X, 1909, 6 ♂, 11 ♀ Rio Mato, X–XI, 1909, 1 ♀ San Esteban; XI, 1910, 1 ♂ Las Quiguas, IX, 1910, 3 ♂ Aroa, XII, 1910, 1 ♂ Canaquito, I, 22, 1911, 1 ♂, 2 juv

Amblytropidia interior Bruner

Maripa, Rio Caura, X, 1909, 1 ♂, 2 ♀

These specimens agree very closely with a pair from Chapada, Matto Grosso, Brazil, determined by Bruner and kindly loaned by the Carnegie Museum The species may be distinguished by its great slenderness and the heavy spination of the hind tibiae. It is larger than *A minor* Bruner and the genicular lobes of the hind femora are not as sharp as in *A vittata*

Giglio-Tos One of the above recorded females has a pale subcostal stripe on the tegmina.

Orphulella concinnula (Walker)

La Piedrita, II, 16, 1911, 6 ♂, 8 ♀, 13 juv Buelta Triste, II, 20, 1911, 1 ♀, 1 juv Rio Mato, X–XI, 1909, 5 ♂, 9 ♀ Aroa, X, 1910, 1 ♀

This species may easily be distinguished from *O punctata* by the evenly rounded, nearly truncate posterior margin of the pronotum

Orphulella punctata (DeGeer)

San Esteban, X–XI, 1910, 14 ♂, 9 ♀, 1 juv Las Quiguas, IX, 1910, 3 ♂, 3 ♀ Rio Mato, X–XI, 1909, 1 ♂, 2 ♀ Ciudad Bolivar, IX, 1909, 2 ♂, 2 ♀ Quiriquire, Monagas, 2 ♀, (Helen K Hodson), [Cornell Univ]

Orphulina balloui (Rehn)

Ciudad Bolivar, IX, 1909, 1 ♂ Maripa, Rio Caura, X, 1909, 1 ♀ Campo Knip, Curaçoa, VII, 2, 1922, 5 ♂, 2 ♀

Further study is needed to ascertain the relationship of this species and *O veteratoria* Rehn [6] from São Paulo, Brazil, and *O pulchella* Giglio-Tos from Paraguay

Staurorhectus longicornis Giglio-Tos

Maripa, Rio Caura, IX, 1909, 8 ♂, 1 ♀, 1 juv

This species has only been known previously from southern South America

CAURATETTIX, new genus

This genus is based on a specimen that is quite distinct from any known American genus, but is apparently a member of the Scyllinae group The related genera of this part of the Acridinae have been most recently discussed by Rehn [7] In this paper he considers the Scyllinae group as consisting of the genera *Scyllina, Euplectrotettix* and *Scyllinops* He places the genus *Psoloessa* (= *Stirapleura*) in a group by itself, the Psoloessae The group Aulocari consists of *Ageneotettix, Eupnigodes, Zapata, Drepanoptera,* and *Aulocara* This latter group is quite distinct from the other two groups In any event this new genus belongs to the genera of the Scyllinae group and the nearest approach is toward *Euplectrotettix* as suggested by the more attenuate form of the latter as compared with *Scyllina* Rehn in describing the genus *Scyllinops* (loc cit, p 228), states, "The broader pronotum and less elongate form will distinguish *Scyllinops* from both of these genera *Scyllina* and *Euplectrotettix*" This new genus has the characteristic long inner apical spur on the hind tibiae The most obvious characters which separate it from the genera discussed is its attenuate form, strongly retreating face, relatively elongate head, lateral foveolae not visible from above, but little longer than deep; more sharply rounded fastigio-facial angle in lateral aspect, and longer lateral lobes of pronotum I have not examined the genotype and unique specimen of *Alota boliviana* Bruner,[8] and said to be related to *Scyllina* According to the description it is slender with an acute fastigio-facial angle, but differs by a number of important details

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[6] Trans Amer Ent. Soc XLIV, pp 194, 195, 1918

[7] Trans Amer Ent Soc., LIII, pp 213–240, 1927

It is interesting to note that this new genus has a very close superficial resemblance to the Old World genus *Eoscyllina* Rehn, but it is almost certainly a matter of parallel development The description of the genotype follows below

Cauratettix gracilis, new species Plate 13, figures 14 and 15

It is unfortunate that we have but one specimen, a female, on which to describe this new species, but do so with no hesitation as it is so unlike anything known

Type — ♀, Maripa, Rio Caura, Venezuela March 1909 (M A Carriker, Jr) [Acad Nat Sci Phila, Type No 5559]

Size large though smaller than most species of *Scyllina*, form slender elongate, facial angle acute, head elongate and narrow in dorsal aspect, median length of the prozona of the pronotum but little shorter than that of the metazona, tegmina extend somewhat beyond hind femora, inner apical spur of hind tibiae twice the length of the inner subapical spur

Head elongate rather conical, facial angle very acute for the Scyllinae group Antennae shorter than the distance between the posterior margin of the pronotum and the fastigium, slightly flattened proximad Eyes not prominent, elongate, length almost twice the width Frontal costa narrowest just below fastigium, widening only slightly ventrad, transversely convex between fastigium and just above median ocellus, lacking lateral carinae, slight and broadly rounded carinae extending from median ocellus almost to clypeal suture. Lateral or facial carinae not prominent Projection of fastigium relatively great beyond eyes, rounding into frontal costa Fastigium with a rounded depression, broader than long, bounded by a very slight carina excepting at the posterior margin, lateral foveolae present but not sharply defined Very slight median carina on occipital region Pronotum irregularly impresso-punctulate on the disk and irregularly impresso-punctate on the lateral lobes; median carina well developed and cut only by principal sulcus, the prozonal portion but slightly shorter than the metazonal, the lateral carinae are only slightly suggested, being most definite near the anterior margin of the prozona, thence becoming obliterated posteriorly on the prozona and replaced by irregular rugae on the metazona, the width of the prozonal disk is widest caudad and slightly constricted mesad, the lateral margins of the metazonal disk are moderately divergent caudad, the posterior margin is obtuse angulate with blunt vertex Tegmina long rather slender projecting slightly beyond hind femora, the apices of tegmina rounded, but with oblique truncation definitely suggested Hind femora relatively long, slender, posterior margin of genicular lobes rounded, but approaching the acute condition The inner apical spur of the hind tibiae twice the length of inner subapical spur, eleven and twelve spines on the outer row of the two tibiae

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[8] Ann Carnegie Mus, VIII, (3 and 4), pp 446, 454, 455, 1913, 1 ♂ Rio Machupo, Bolivia, type in Carnegie Museum.

Coloration. General color dull fuscous brown, a pale buffy brown stripe from the vertex of head to caudal margin of pronotum, the stripe on pronotal portion bordered by a fuscous black area A slight buffy brown stripe is present on the prehumeral area of the tegmina Tibia red becoming brownish on the proximal ventral portion, spurs and spines tipped with black

Measurements Length of body 34 5, length of antennae 10 , length of pronotum 5 5, length of tegmina 28 , length of hind femora 20 mm

Scyllina pratensis (Bruner)

Ciudad Bolivar, IX, 1909, 38 ♂, 38 ♀, 3 juv

This is evidently the low grassland form of northeastern South America The type locality is Pernambuco, Brazil and it is very desirable to obtain a topotypic series to be certain of the status of Venezuelan material

Scyllina smithi Rehn

Maripa, Rio Caura, X, 1909, 1 ♂, 1 ♀

To find this species, described from Chapada, in this northern area for the first time is extremely interesting, suggesting a close relationship of this grassland area to that of southern Brazil

Scyllina cyanipes (Fabricius)

Williamstad, Curaçoa, D W I , VI, 17, 1922, 2 ♂ Campo Knip, Curaçoa, D W I , VII, 2 & 8, 1922, 7 ♂, 4 ♀ Aruba, D W I , VII, 22–28, 1922, 2 ♂, 2 ♀ Bonaire, D W I , 2 ♂, (E Hartert) Bonaire, D W I , 1923, 1 ♂, 2 ♀, [Collection of Dr R Ebner]

Hebard[9] has worked out the synonymy of this species which occurs in the West Indies and northern South America

OEDIPODINAE

Lactista pulchripennis Saussure

Ciudad Bolivar, IX, 1909, 13 ♂, 10 ♀, 1 juv Oranjestad, Aruba, D W I , VII, 28, 1922, 10 ♂, 3 ♀

The specimens from the Island of Aruba are much undersized compared with specimens from the mainland

PAULININAE

Paulinia acuminata (DeGeer)

Rio Orinoco near San Felix, IX, 15, 1909, 14 ♂, 18 ♀ Buelta Triste; II, 20, 1911, 1 ♀

PYRGOMORPHINAE

Minorissa pustulata Walker[10]

Rio Mato, X–XI, 1909, 1 ♀.

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[9] Trans Amer Ent Soc, XLIX, pp 211, 212, 1923

[10] Cf. Uvarov, Trans Ent Soc London, p 283, 1925

Omura congrua Walker

Rio Mato; X–XI, 1909, 1 ♀

CYRTACANTHACRINAE

Agriacris jucunda (Walker)

1870 *Xiphocera jucunda* Walker, Cat Derm Salt B M III, p 523 [Venezuela].

San Esteban, X–XI, 1910, 1 ♂, 1 ♀

These two specimens agree closely with a series from Trinidad except the tegmina of the male do not extend to the apex of the abdomen and the female lacks any pale tegminal spot It is highly probable that *A bilunata*[11] is a synonym, and I question whether the type ever came from Colombia Gerstaecker's description of the type gives no valid distinction between the two species and though we have four or more species of the genus in our large studied and unstudied collections from Colombia we have none representing this form of the genus from there.

Tropinotus[12] **angulatus** Stål

Cariaquito, I, 1911, 1 ♀, I, 14, 17, 1911, 2 ♀, III, 15, 1911, 1 ♀ Ciudad Bolivar, IX, 1909, 1 ♀ Maripa, Rio Caura, X, 1909, 1 ♂

This genus is badly in need of study or revision as there are some twenty-four described species and even from a casual study some of them are certainly synonyms The above recorded material agrees most closely with Stål's *angulatus* described from Bahia, Brazil Comparing the Venezuelan material with specimens from the region around Ceara and Natal, eastern Brazil, the former is considerably larger but very close in other respects A pair of the above recorded specimens from Cariaquito, that have their wings spread, have the disk of the hind wing an orange red color

T rosulentus (Stål) is the form occurring in Colombia and may be distinguished by its blunter, less produced vertex and the lateral margin of the pronotal disk is not produced to form a sharp angle at its widest point, being more rounded *T strigatus* (Bruner) described from Chapada is closely related to *T. angulatus*, but is readily distinguished by the acute apices of the tegmina That species I believe to occur in southwestern Brazil, eastern Bolivia and Peru

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[11] 1873 *Xiphocera bilunata* Gerstaecker, Stett Ent Zeit, XXIV, p 187, [Colombia]

[12] Much confusion has existed concerning the valid name for this genus I am indebted to Mr Hebard for bringing the facts of the case to my attention *Tropinotus* Kuhl 1822 (Reptilia) is a nomen nudum, according to Dr Leonhard Stejneger in Caudell Bois in 1826 used the name *Tropidonotus* as an emendation of *Tropinotus* Kuhl and associated specific names with the genus for the first time and hence the former is a valid name for the group of Reptilia Kuhl's name however has no status In 1831 Serville used the name *Tropinotus* for this genus of Orthoptera, which is not of course invalidated by Kuhl's name Stål in 1878 emended Serville's name to *Tropidonotus* which is the correct combination of the word, but there is no authority to do so under the code of nomenclature and hence this is a synonym of *Tropinotus* Serville as well as a homonym of *Tropidonotus* Bois. Gistel in 1848 considering *Tropinotus* Serville as invalidated by *Tropinotus* Kuhl (nomen nudum) erected the name *Xyleus* and also Bolivar in 1906, unaware of Gistel's name, proposed the name *Diedronotus* for the same reason Caudell in Proc U S Nat Mus, Vol 80, Art 21, p 3, 1932, discussed this matter, but unfortunately did not appreciate that Serville's name was perfectly valid and considered the use of *Xyleus* Gistel as correct Reference to the authors mentioned here may be found in Caudell's paper It is sincerely hoped that this will finally put at rest this unfortunate mix-up

Colpolopha obsoleta (Serville)

> 1831 *Tropinotus obsoletus* Serv, Ann Sci Nat, XXII, p 274, n 3 [Du cap de Bonne-Esperance (in error, in all probability from Brazil or the Guianas)]
> 1875 *Colpolopha burmeisteri* Stål, Bihang Svensk Akad Handl, III, (14), p 27, n 1, [Venezuela]

San Esteban, X–XI, 1910, 1 ♂, 2 ♀ Santa Elena, Merida, VIII, 1922, 200 ft (humid forest), 1 ♂, 1 ♀ Aroa, XII, 1910, 3 ♂, 2 ♀ Sabana Mendoza, Los Andes, IV, 28 to V, 3, 1922, 1 ♂, 2 ♀

Stål described *C burmeisteri* from Venezuela, but was apparently unaware of Serville's species In studying specimens from Brazil, the Guianas and Venezuela, I can see no character sufficient to separate the Venezuelan material, and therefore place Stål's species in synonomy It is worth noting that specimens from Aroa, Venezuela have the pale proximal area of the hind wings extending further distad and its limits more sharply defined or less suffused than the rest of the material at hand This character is rather variable however, as indicated by material from other localities

Eutropidacris cristata (Linnaeus)

Maripa, Rio Caura, X, 1909, 1 ♀ Margarita Island, 1 ♀, [A N S P Coll] Las Piedras, 1 ♀, [A N S P Coll]

Tropidacris latreillei (Perty)

Sabana Mendosa, Merida, IV, 28 to V, 3, 1922, 2 ♀ San Esteban, X, XI, 1910, 1 ♀ Quiriquire, Monagas, 3 ♂, 6 ♀, (Helen K Hodson), [Cornell Univ]

Group Jivari

Hebard [13] considers this group as separate though closely related to the group Pezotettiges (= Platyphymae) of the Old World. The group, as considered, consists of the genera *Jivarus* Giglio-Tos and *Urubamba* Bruner [14] and occurs in the higher Andes These genera are suggestive of the Melanopli, but readily distinguished by the presence of a disto-external spine on the hind tibiae immediately adjacent to the disto-external pair of spurs, which places them in a quite different section of the cyrtacanthacrids. *Jivarus* includes two species *J. americanus* Giglio-Tos and *J alienus* (Walker) [15] 1870 described from Peru and Ecuador respectively Bruner erected the genus *Urubamba* to include two species *U aptera* and *U inconspicua* from Peru Hebard[18] has described another species from Ecuador, *U ecuadorica*

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[13] Hebard, Proc. Acad Nat Sci Phila., LXXVI, p 184, 1924

[14] Bruner, Proc U S Nat Mus., 44, p 182, 1913

[15] Cf Uvarov, Trans Ent. Soc London, p 268, 1925

Generic diagnosis of the Group Jivari

A *Fastigio-facial angle in lateral aspect relatively acute* Interocular area of vertex longitudinally depressed producing thick low lateral carinae. Disk of pronotum smooth, not irregular, transverse sulci very slight or obsolete . . . *Jivarus* Giglio-Tos

B Fastigio-facial angle in lateral aspect very slightly acute and facial line somewhat convex *Interocular area of vertex very wide and slightly convex* Disk of pronotum smooth, not irregular, transverse sulci obsolete .. *Oreophilacris*, new genus

C Fastigio-facial angle not acute and facial line straight, not convex Interocular area of vertex longitudinally sulcate with broad low lateral carinae *Prozona of disk of pronotum irregularly convex in lateral aspect, three transverse sulci of disk quite pronounced, though not deep* *Urubamba* Bruner

OREOPHILACRIS, new genus

This genus is erected to contain the genotype and new species *O paramonis*, based on one male from the Paramo Zone of the eastern branch of the Andes This interesting small short-winged group of grasshoppers will undoubtedly have their number of known forms increased when the fauna of the higher Andes is better studied This genus is closely allied to the other two genera of the group and I believe that it is best placed between these From the table above can be seen that no one feature readily separates all three genera and hence have italicized the most important one in each case. Another striking feature of this new genus is the relatively small round eyes, the width almost equal to the depth For additional details see description of genotype below

Oreophilacris paramonis, new species Text-plate, figure 7, plate 13, figs 18-19

Type — ♂, Paramo de Rosas, Venezuela Elevation 10,400 ft March, 1911 (M A Carriker, Jr) [Acad Nat Sci Phila, Type no 5560]

Size small, form relatively robust, brachypterous.

Head in frontal aspect oval, about width of thorax Dorsum of head and frontal costa in lateral aspect convexly arcuate forming an obtuse blunt angle at their juncture Face moderately retreating, impresso-punctate Frontal costa slightly and broadly sulcate in region of median ocellus, becoming obsolete towards fastigium and clypeal suture, margins of costa well defined except just above clypeal suture, but not forming definite carinae Fastigium declivent, bluntly triangulate Fastigium and interocular area transversely convex having no impression or carinae No lateral foveolae Eyes small, but moderately prominent, their width almost equal to their depth Antennae short, cylindrical, rather heavy

Pronotum slightly impresso-punctate; lateral lobes glossy, disk not glossy Lateral lobes only cut by the transverse sulcus anterior to the principal one and cut slightly by one close to the anterior margin. Pronotal disk lacks sulci and median carina, smooth, not irregular, at lateral margins a slight angle or break is formed with pronotal lobes, lateral margins of disk strongly expanded caudad, caudal margin broadly concave Prosternal spine moderately heavy, directed somewhat caudad, cephalic and caudal faces flattened, in cephalic aspect pyramidal, apex moderately transverse or broadly convex

Tegmina extend to the caudal margin of first abdominal tergite over tympana, length three and a half times the median width, ventral margin convex; dorsal margin concave, apex bluntly rounded, two longitudinal percurrent veins only distinct venation

Cerci flattened, quite broad proximad, margins tapering gradually to midpoint, thence expanding feebly, the disto-dorsal margin convex, the disto-ventral margin weakly concave and meeting to form an acute apex directed caudad The distal half of the outer face broadly sulcate on its longitudinal axis Subgenital plate in lateral aspect has the ventral surface curving rapidly dorsad, the lateral margins in lateral aspect extending straight from cerci to the apex which forms a blunt tubercle directed dorsad, the lateral margins in dorsal aspect are moderately convex to the apex Supra-anal plate considerably longer than broad, lateral margins tapering moderately and rounding off just before apex to form a rather blunt obtuse angle at the apex, a transverse carina is situated one third the length from the base of the plate Furculae are small, relatively short, sub-adjacent and cylindrical

The distal margin of the genicular lobes of the hind femora are bluntly rounded The right hind tibiae (distal portion of left one missing) has ten pairs of spines, the outer distal one is immediately adjacent to the outer pair of apical spurs

General coloration dull olive brown, inner and ventral face of hind femora dull yellow brown, hind tibiae bright red with the spurs and spines tipped with black

Measurements Length of body 13 2, length of antennae 5 5, length of pronotum 3 8, length of hind femora 9 5, length of wing pads 2 5 mm

Unfortunately we have but one specimen representing this species

Leptysma insularis (Bruner)

Anzoategui; (in marsh), II, 1911, 1 ♂ Guamito, Trujillo, Los Andes, V, 16–20, 1922, 1 ♀

Leptysma perlonga Hebard

This species was described in 1923 based on specimens from Maripa, Rio Caura, Venezuela

Leptysma minima Bruner

Buelta Triste; II, 20, 1911, 1 ♀.

Opshomala cylindrodes Stål

Cariaquito; I, 1911; 1 ♂, 1 ♀.

Inusia chipmani chipmani Bruner.

Maripa, Rio Caura, X, 1909; 1 ♂

Cornops longipenne (DeGeer)

Cariaquito, I, 1911, 1 ♀ Caño d'Vagre; I, 28, 1911, 1 ♂

Oxyblepta limbatipennis (Stål)

San Esteban, X–XI, 1910, 1 ♀.

This and the following species are very close This form was described from material from Colombia and has been recorded from Panama It may be distinguished from *O. xanthochlora* from Brazil by its less prominent eyes and the dorsal margin of the black band on the sides of the pronotum not as sharply defined or becoming suffused towards the dorsum of the pronotum The specimen recorded above differs from all others examined in that the tegmina barely extend as far as the caudal apices of the hind femora, whereas in all others the tegmina extend considerably beyond this point

Oxyblepta xanthochlora (Marschal)

Rio Mato, X–XI, 1909, 1 ♀

Coscineuta matensis Rehn

1918 *Coscineuta matensis* Rehn, Trans Amer Ent Soc, XLIV, pp 331-335, 4 figs

This species was described from material of the present collections under study and give below the data as recorded by Rehn

Rio Mato, X–XI, 1909, 3 ♂, 6 ♀ ; [including type and allotype], (M A. Carriker, Jr), [A.N S.P]

Phaeoparia emarginata Stål

San Esteban, X–XI, 1910, 3 ♂, 1 ♀ Las Quiguas, IX, 1910, 1 ♂.

Abracris obliqua (Thunberg)

San Esteban, XI, 1910; 1 ♂

Osmilia flavolineata (DeGeer)

Cariaquito; I, 1911, 15 ♂, 24 ♀, 2 juv. Guinapa River, II, 1911, 1 ♂ Buelta Triste, II, 20, 1911, 3 ♂, 1 ♀ Las Quiguas, IX, 1910, 1 ♂, 1 ♀ Maripa, Rio Caura, X, 1909, 1 ♂ Rio Mato, X–XI, 1909, 1 ♂, 5 ♀. San Esteban, XI, 1910, 2 ♂, 3 ♀ Sabana Mendoza, Los Andes, IV, 28 to V, 3, 1922, 1 ♀ Quiriquire, Monagas, 1 ♀, (Helen K Hodson), [Cornell Univ]

Vilerna aeneo-oculata (DeGeer)

Cariaquito, I, 17, 1911, 1 ♂, 5 ♀, 1 juv. Rio Mato, X–XI, 1911; 1 ♂, 3 ♀.

Sitalces punctifrons Stål

San Esteban, X–XI, 1910, 1 ♂, 2 ♀. Aroa; XII, 1910, 2 ♂

Stål 1878 described this species and *S coxalis* from Caracas from females only *S coxalis*, according to the description, may be distinguished by the absence of any tegminal pads I have seen no material of this latter species. Bruner 1906 described *S trinitatis* from Trinidad I find upon comparing females from Trinidad with the above recorded material that they are almost indistinguishable On the other hand the genitalia of the males are markedly different I have no material from Caracas and males have never been described from there, but I believe males from Caracas will almost surely prove to be similar to the above recorded material and not to the Trinidad species

A diagnosis of the male from San Esteban follows

In general it is closely similar to the males of *S trinitatis* except it lacks the broad, pale, very pronounced median dorsal stripe on the pronotum and abdomen which is present on the latter The males have the supra-anal plate considerably longer than broad, the lateral margins are very slightly convergent to the apex which is broadly transverse In *S trinitatis* the supra-anal plate is triangulate, the proximal width is greater than the length The cerci of *S punctifrons* are very long, rather slender and flattened becoming cylindrical near the apex and tapering to a fine point; the distal half is strongly bent ventro-mesad The free margin of the subgenital plate in dorsal aspect is approximately semi-circular The tegminal pads are elongate and just extend over and completely cover the tympana

Bruner, (Biologia Centrali-Americana, II, p 291, 1908), distinguishes *S trinitatis* from *S punctifrons* by stating that the latter is distinctly punctate whereas the former is almost impunctate This character is variable in both species and of no diagnostic value

Sitalces trinitatis Bruner

Cariaquito, III, 15, 1911, 3 ♂, 4 ♀, 1 juv

This series agrees closely with material from Trinidad,[16] the type locality The Venezuela specimens differ in having the hind tibiae rather light greenish blue instead of dark glaucous as in the Trinidad specimens

SCHISTOCERCA Stål

There are quite obviously several species of this genus well represented in the collections before me, but owing to the abundance of names and the elusive characters, which separate the various species, it seems preferable to omit what would be but very tentative determinations until a careful revision of the group can be undertaken In doing thus it will at least avoid adding further confusion to the literature

Trigonophymus punctulatus (Thunberg)

Maripa, Rio Caura; X, 1909, 1 ♂, 1 ♀.

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[16] Sangre Grande, Trinidad, B. W I., IV, 5-12, 1930, 4 ♂, 3 ♀, 2 juv. Brasso, Trinidad, B W I.; IV, 14, 1930, 1 ♀, (G Belmontes); [Hebard Coll]

PEDIELLA, new genus

This genus is based on a striking and unique male from the Andean region around Merida In many respects it suggests *Pedies* Saussure and undoubtedly should be considered as a closely related genus Comparing it with the genotype *Pedies virescens* Saussure from Mexico, it has the relatively slender form, decidedly retreating face, relatively long lateral lobes of the pronotum, decidedly longer than deep, apex of subgenital plate extending considerably beyond apex of supra-anal plate It differs most strikingly by a sharper less rounded fastigio-facial angle, the lateral margins of the pronotal disk are indistinct, rounding into the lateral lobes, instead of having a distinct angle formed by the plane of the pronotal disk and the lateral lobes at which place lateral carinae are suggested, the wing pads lack the very pronounced longitudinal venation and are rather reticulate with only a few weak longitudinal veins

Pediella colorata, new species Text-plate, fig 8, plate 13, figs 20 and 21

Type—♂, San Pablo,[17] Venezuela, elevation 3000 m Upper Timber Line November 9, 1899 [Acad Nat Sci Phila, Type no 5561]

Size small, relatively slender Face decidedly retreating, smooth, glossy and only very slightly impresso-punctate, frontal costa not sulcate or longitudinally depressed and smoothly rounded into fastigium, lateral margins becoming obsolete below region of median ocellus Cephalic margin of fastigium in dorsal aspect bluntly rounded, broader than long, lacking any lateral carinae or median impression Interocular area with a broad, rather shallow, longitudinal sulcation, strongest cephalad Eyes large but not prominent Antennae short, rather heavy and slightly compressed

Disk of pronotum impresso-punctate, especially the prozona, transverse sulci apparent but not deep, lateral margins not defined broadly rounded into lateral lobes, caudal margin at median point emarginate, broadly obtuse angulate, lateral portion broadly convex Length of lateral lobes of pronotum considerably greater than the depth, median portion of caudal margin slightly concave Prosternal spine directed strongly caudad, transversely flattened, apex decidedly bilobate

Tegmina brachypterous, decidedly laterad, extending to the caudal margin of the first abdominal tergite, median width about two thirds the length, apex broadly rounded, venation finely reticulate with a few weak longitudinal veins.

Cerci simple, slender, slightly flattened, directed dorsad and with apex sharply pointed and directed slightly caudad Subgenital plate not swollen, strongly curved dorsad, margins in lateral aspect straight, in dorsal aspect moderately arcuate, converging to form a sharply rounded apex which latter point is considerably beyond the apex of the supra-anal plate Supra-anal plate longer than broad, a broad, median longitudinal sulcus, lateral margins converge almost straight to apex which is sharply rounded

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[17] The above locality I have been unable to find with certainty but it must be in the Andean region owing to the high elevation given I find on a map, Atlas de Venezuela, Estado Zula, 1916, a Laderas de Sn Pablo about 50 km to the southwest of Merida

Genicular lobes of hind femora bluntly rounded distad. Hind tibiae with nine spines on their outer margin, no apical spine adjacent to the outer pair of spurs.

General coloration above and sides of pronotum a very dark green, face and thoracic sternites dull, pale, greenish white, abdominal sternites bright orange red, ventral and internal portions of femora and tibiae bright red, tibia spines and spurs tipped with black.

Measurements. Length of body 16.5, length of antennae 3.8, length of pronotum 4.2, length of tegmina 2.8, length of hind femora 10 mm.

The type is unique.

MERIDACRIS, new genus

This genus is erected to include two new species, *M. diabolica*, the genotype, and *M. subaptera*, a very closely related species of the same general region but apparently occurring at a lower altitude. Owing to the very distinctive features of this genus from anything known, it is difficult to be sure of its proper generic relationship or association among the South American Melanopli. This may be due to two reasons. First, because of the high altitude of its habitat, there is a tendency to obscure its phylogenetic characters of importance, and secondly, because of our lack of knowledge of the fauna of the higher Andes, many unknown forms await discovery to fill in the gaps. I believe, however, that it should be placed between the *Pedies-Piediella* and the *Chlorus-Chibchacris* associations.

The most important generic characters are the following.

Face moderately retreating, fastigium projects prominently beyond eyes, bluntly rounded in dorsal aspect, somewhat rugose with longitudinal sulcation and lateral carinae slightly suggested or obsolete. Surface of pronotum very irregular and somewhat inflated. Disk rounds into lateral lobes and lacks any median or lateral carinae, transverse sulci of disk but faintly suggested or obsolete, caudal margin of disk concave. Tegmina very much reduced, not extending beyond the tympana, straight and slender. Subgenital plate with a prominent blunt tubercle at its apex, two small rather flattened, sub-adjacent furculae are present.

Meridacris diabolica, new species. Text-plate 13, figs. 3 and 4, plate 13, figs. 16 and 17.

This handsome species evidently is to be found in the high paramo country of the Andes of Merida. In size it is quite large and robust, the females are heavy and fusiform in shape. In coloration they are almost black with rich red areas on the terminal portions of the leg joints, base of the antennae and mouth parts. The hind tibiae are not red except close to the articulation with the hind femora. The abdomen is strikingly banded, the caudal margin of each abdominal segment being bright yellow and occasionally tinged with red.

Type. — ♂, La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 12,000 ft. June 1, 1922. (M. A. Carriker, Jr.) [Hebard Collection, Type no. 1306]

Face but slightly retreating, frontal costa moderately impressed along its median longitudinal line. Fastigium produced well beyond the eyes; quite broad and bluntly rounded from dorsal aspect, surface rather irregular and slightly impresso-punctate, a slight median impression suggested on the anterior portion of the interocular space, fastigium from lateral aspect moderately declivent rounding evenly into the frontal costa, (in many of the paratypes the fastigium is less depressed and thus forming a more pronounced angle with the frontal costa) Antennae short and heavy, less than length of head and pronotum Eyes small, much reduced.

Surface of pronotum very irregular, somewhat inflated and impresso-punctate, disk rounds into lateral lobes and lacks any carinae, transverse sulci but slightly suggested on the disk, caudal margin of disk broadly concave, length of lateral lobes of pronotum considerably greater than the depth Prosternal spine short, heavy, pyramidal, apex forming a bluntly rounded point.

Tegmina straight slender pads just extending over the tympana (in some of the paratypes the tegmina barely reaching as far as the tympana), length about four times the median width, apex bluntly rounded, venation reticulate with no very definite longitudinal veins.

Cerci heavy, broadly flattened and slightly incurved apically, apex bluntly rounded, outer face of distal portion with a slight impression Subgenital plate strongly upcurved with a very prominent blunt apical tubercle Supra-anal plate proportionately large and tongue shaped Prominent short and broad furculae are present

Hind femora decidedly heavy, genicular lobes unusually wide and very broadly rounded distad Hind tibiae with nine outer spines

Allotype —; same data as type [Hebard Collection]

Similar in most details and coloration to the male Size decidely larger, *thoracic region proportionately much heavier or swollen producing a heavy* fusiform appearance in dorsal aspect

In addition to the type and allotype we have 13 ♂, 15 ♀, and 3 immature paratypes

Measurements (Extremes of adults) Length of body ♂ 19–21.5, ♀ 27–30, length of antennae ♂ 7, ♀ 9–10; length of pronotum ♂ 4.5, ♀ 6, length of tegmina ♂ 2–3 2, ♀ 3.2–4, length of hind femora ♂ 11.5–12, ♀ 13–14 5 mm

Meridacris subaptera, new species Text-plate 13, figures 5 and 6

Except for differences of color and proportion this new species is very close to the preceding one, *M diabolica* here described. In size it is considerably smaller Pronotum from dorsal aspect proportionately broader. Tegmina much more reduced extending less than half the distance to the tympana Cerci and furculae much smaller, not so heavy, and thickened. In coloration areas of red much more extensive Hind tibiae and inner face of hind femora rich red, median portion of prozona and entire metazona dark red

Type.—♂, Merida, Venezuela [Acad Nat Sci Phila, Type no 5562].

General form of head, eyes and antennae closely similar to preceding species except the face is proportionately less deep from fastigium to clypeal suture and frontal costa somewhat wider Frontal costa more convexly arcuate in lateral aspect Dorsum of pronotum broader, flatter and more inflated and caudal margin more deeply concave, length of pronotal lobes greater in proportion to depth, caudal margins more oblique and rounding evenly into ventral margins, lacking any suggestion of an angle formed The prosternal spine lacks any point or tubercle and is little more than a thick, transverse ridge[18] The tegminal pads are very much reduced not extending half the distance to the tympana Cerci similar, but more slender and less incurved distad, supra-anal plate and furculae similar but again smaller, the apex of the subgenital plate has a distinct tubercle which is more cylindrical and not slightly transverse

In addition to the coloration mentioned above, the general tone is not as blackish but more greenish, the color of the dorsum of the abdomen appears to have faded to a dark reddish brown, but the banded appearance of the other species, due to the light yellowish bands on the margins of the tergites, was almost certainly never present in this one, in addition to the red area on the ventral part of the abdomen, the median portion of the subgenital plate and cerci are red

Allotype—♀, Merida, Venezuela, elevation 1,600 m [Acad Nat Sci Phila]

Except for being decidedly larger and heavier, closely similar to type In coloration it is also similar except the face lacks the buffy coloration ventrad and instead, the head is a reddish black The pronotum has the metazona red, but the prozona has a red band along the cephalic margin instead of a red area on its median longitudinal portion as in the male type The ovipositor valves are also red

Measurements (Type and allotype) Length of body ♂ 16, ♀ 26, length of antennae ♂ 6, ♀ 7, length of pronotum ♂ 4, ♀ 5.5, length of tegmina ♂ 0.9, ♀ 0.8, length of hind femora ♂ 9.5, ♀ 11 mm

In addition to the type and allotype there is a pair labelled merely Merida, Venezuela, belonging to the Hebard Collection They are closely similar to the pair described above

CHIBCHACRIS Hebard

This genus was erected by Hebard 1923 to include the genotype *C. furcata* and two other new species and also *Pezotettix varicolor* Stål all described from Colombia This new species has certain characters strongly suggesting the closely allied genus *Chlorus* Giglio-Tos As the male genitalia are so suggestive of *Chibchacris casanare* Hebard, however, there is little doubt of its generic position. It differs from Hebard's generic description in that the caudal margin of the pronotal disk is transverse instead of weakly convex, the tegmina are broadly oval, but never overlapping and there is no distinction in the plane of the discoidal and marginal fields

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[18] This may be abnormal for the species however as the prosternal spine of the female allotype has a blunt, heavy, but definite point or angulate apex

Chibchacris carrikeri,[19] new species Text-plate 13, fig 13, plate 14, figs 26 and 27

This species may be most readily distinguished from the other members of the genus in having the caudal margin of the pronotal disk transverse or occasionally very slightly convex It is most closely related to *C casenare* Hebard in that furculae are present in the males and the females lack the strongly expanded pronotum caudad

Type — ♂, La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft VI, 1, 1922 (M A Carriker, Jr) [Hebard Collection, type no 1307]

Size medium, general color from above and the sides very dark green

Face moderately retreating and slightly convex in lateral aspect Fastigium strongly declivent, rounding into frontal costa Frontal costa but slightly and broadly sulcate at and above the median ocellus, lateral carinae thick, not prominent, becoming obsolete below the median ocellus Fastigium moderately impressed and with lateral carinae Antennae rather short and heavy, cylindrical Eyes not prominent, a little smaller in proportion than in the other species of the genus

Pronotal disk somewhat flattened, three transverse sulci, median carina but faintly suggested on metazona, no lateral carinae, caudal margin transverse, lateral lobes longer than deep Prosternal spine transversely broad proximad, tapering rapidly to a well-produced spine with a blunt apex Tegmina broadly ovate extending well over the second abdominal tergite, inner margins never overlapping.

Caudal portion of abdomen moderately upturned, free margin of subgenital plate straight in lateral aspect, in dorsal aspect the lateral margins are moderately convex, converging to apex which is bluntly rounded and in a position considerably beyond the apex of the supra-anal plate The cerci are strongly suggestive of *Chibchacris casenare* which have the main trunk small styliform with a large tooth-like process extending mesad from the inner apical margin In the case of the present species this tooth-like process is much more expanded and flattened proximad The supra-anal plate is broader than long, lateral margins slightly convex, converging evenly to the apex Very small furculae present

Genicular lobes of hind femora rather wide with caudal margin broadly rounded Hind tibiae with nine spines on external margin

Allotype — ♀, same data as type [Hebard Collection]

Decidedly larger but closely similar in general proportions and details to the male type The pronotum is moderately expanded caudad as compared with the male, but not to such a marked degree as in *C. digitifera* and *C furcata* The external margins of the hind tibiae have ten spines (more often eight or nine among the paratypes).

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[19] Named in honor of Mr M A Carriker, Jr, well known for his studies and field work in ornithology of the Neotropical World, and who incidentally collected the large majority of interesting material recorded in this paper

Coloration The female may be distinguished from the females of the other species in its lacking the pale area on the ventral portion of the lateral lobes of the pronotum As mentioned before, the general color above and on sides is very dark green In the male the abdomen and hind femora are yellowish ventrad, the hind tibiae are yellow, but sometimes tinged with green, also occasionally reddish The abdomen of the female is reddish black ventrad, the ventral and inner face of the hind femora are deep red, the hind tibiae are brownish yellow sometimes tinged with red

Measurements (Extremes of the series) Length of body ♂ 13–15, ♀ 18–20 5, length of antennae ♂ 5–6, ♀ 6–6 5, length of pronotum ♂ 3 5–4, ♀ 4 5–5, length of tegmina ♂ 3–3 8, ♀ 4–4 5, length of hind femora ♂ 9–9 5, ♀ 9 5–11 mm

In addition to the type and allotype we have 18 ♂ and 15 ♀ paratypes from the same locality with similar data Besides these there is a rather discolored female from Paramo de Rosas, elevation 10,400 ft III, 1911, (M A Carriker, Jr)

TIMOTES, new genus

This is another distinctive genus which belongs to the South American Melanopli The *Trigonophymus* association of species is evidently the generalized central stock of the South American Melanopli and similar in this respect to the genus *Melanoplus* of North America As in the case of the two preceding new genera, this new genus is a strikingly divergent form and its relation to other genera of the group is of some uncertainty In some respects it suggests the genus *Propedies* which has the disk of the pronotum evenly rounded into the lateral lobes and strongly sulcate, but in *Propedies* the metazona of the pronotum is much reduced and the caudal margin is concave whereas this genus has the metazona relatively large and decidedly convex on its caudal margin

Other generic features follow

Eyes rather prominent, interocular area relatively narrow, fastigium projects prominently beyond the eye, decidedly declivent, face moderately retreating, brachypterous, tegmina broadly ovate, venation finely reticulate with few if any pronounced longitudinal veins, dorsal margins not quite meeting on mid dorsal line, furculae of male small adjacent processes, supra-anal plate of male broad, shield-shaped, hind femora with no mid-dorsal, apical spine

This genus is erected to include *T parvum* genotype, and *T affinis*, both new species

Timotes parvum, new species Text-plate, figs 9 and 10, plate 14, fig 22

This and the following species are very close in their general features and it is unfortunate that we have practically no idea as to their relative geographical distribution as the latter species is merely labelled Merida with no collector and date and may have come from almost anywhere in the Merida Andes For characters to distinguish the two species see notes under *T. affinis*.

Type — ♂, La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft June 1, 1922 (M A Carriker, Jr.) [Hebard Collection, Type no. 1305].

Face moderately retreating, frontal costa slightly sulcate with low lateral carinae extending almost to clypeal suture; in lateral aspect the costa is almost straight from the clypeal suture to a point midway between the median ocellus and the fastigium where it forms a rounded, very obtuse angle and from thence extends straight for a short distance to the apex of the fastigium The fastigium is well produced beyond the eyes, rather strongly declivent, running in a straight line from the narrow interocular area to the apex and forming an obtuse rounded angle with the frontal costa, the median portion slightly impressed with definite lateral carinae which diverge from the interocular area to a point near the apex and from thence converge to meet the lateral carinae of the frontal costa Antennae rather heavy, subcylindrical, (tips broken off) Eyes rather large and prominent

Pronotal disk cut by three deep, very pronounced transverse sulci, and rounds into lateral lobes without any defined lateral margins, prozona of disk lacks any median carina, metazona has slight median carina, surface impresso-punctulate almost reticulate, the caudal margin broadly convex almost angulate, the length of the metazona is about two thirds the length of the prozona Prosternal spine rectangulate proximad and gives rise to a prominent, cylindrical, blunt spine Tegmina broadly ovate, inner margins almost attingent, apices rounded and extending over the second abdominal segment.

Free margin of subgenital plate smoothly rounded in dorsal aspect with no tubercle or emargination Cerci rather small, lateral margins tapering from their base to a point two thirds the length of the cercus at which point the whole apical third is bent dorso-mesad to form an obtuse angle with the basal portion and lies in the plane of the external face, the apices are moderately pointed Furculae small adjacent processes The supra-anal plate is broadly shield shaped, slightly wider than long

The genicular lobes of the hind femora are wide, their ventral margin extends from its proximal origin disto-ventrad to a mid-point where it forms an obtuse rounded angle and from there extends to the rather broadly rounded distal margin Caudal tibiae with nine spines on their outer margins

Allotype — ♀, same data as type. [Hebard Collection]

Larger and thorax proportionately thicker caudad, but similar to the male type The frontal costa differs in being impressed on its median line only at and just below the median ocellus, but not above this point.

Coloration General color of both type and allotype a dark brown, but believe the original body color has been largely lost due to poor preservation or drying The ventral portion of the hind femora, however, are a rich red color, and the hind tibiae are a dull brownish red.

Measurements Length of body ♂ 15 (apex of abdomen strongly upturned), ♀ 18; length of pronotum ♂ 3.5, ♀ 4.5, length of tegmina ♂ 2.8, ♀ 3.8; length of hind femora ♂ 8.8, ♀ 10 5 mm

The type and allotype are all we have representing this species

Timotes affinis, new species Text-plate, figs 11 and 12, plate 14, fig 23.

Whether to recognize this material represented by a pair of individuals as a species or merely an extreme variation of the preceding one is rather a puzzle. There is a very interesting parallel between this case and that of *Meridacros diabolica* and *M subaptera* which are also from the same two localities Certainly differentiation is evident and whether it is due to isolation or differences of environment remains to be seen It is highly probable that these closely related species will best be considered as geographical races when more is known of their distribution

The important features which distinguish this species from the preceding one, *Timotes parvum*, are the fastigium and frontal costa project to a much lesser degree especially in the female, the much greater relative size of the female, though the males are about equal in size, the relatively greater width of the head especially in the female, proportion of the wing pads, the form of the male cerci and the color of the hind tibiae

Type—♂, Merida, Venezuela [Hebard Collection, Type no 1308]

Size and form similar to the type of *Timotes parvum* except in the following respects·

Fastigium more declivent, projecting to a lesser degree cephalad and rounds more broadly into the frontal costa The frontal costa in lateral aspect lacks any angular break midway between the median ocellus and the fastigium The wings pads are proportionally narrower and the apices are more narrowly rounded The apical portion of the cerci are more strongly bent in forming approximately a right angle with the dorsal margin of the basal portion instead of an angle of about 65° Also the apical portion is more expanded with the apex bluntly rounded The hind tibiae are a very dark green instead of brownish red and have seven and eight external spines instead of nine

Allotype —♀, same data as type [Hebard Collection]

This female differs in much the same respects as the male except of course for the cerci

In addition to this however the size is half again as large as the allotype of *T parvum* The head also is proportionately much wider and the fastigium projects to a much lesser degree.

Coloration Head, pronotum and legs dull olive green with the exception of the male which has the hind femora on the ventral portion a dark red

Measurements. Length of body ♂ 15 (apex of abdomen upturned), ♀ 23.5, length of pronotum ♂ 3.5, ♀ 6, length of tegmina ♂ 2.5, ♀ 5.5, length of hind femora ♂ 8.8, ♀ 12.5 mm

The type and allotype are all we have representing this species.

Propedies minutus, new species Plate 14, figs 24 and 25.

This little almost apterous member of the Melanopli is evidently a member of this genus which had previously only been known from southern South America, but there appears to be no generic character by which to separate it in spite of the minute size,[20] almost apterous condition, and the relatively unspecialized external genitalia of the male It agrees with this genus [21] in that the furculae are small adjacent processes, the caudal femora have a dorso-median spine at the apex, and the general form of the fastigium and pronotum are similar Though there is a certain resemblance to *Phaedrotettix*, it differs in having the ventral margins of the genicular lobes of the caudal femora rather obtusely angulate instead of being straight or very broadly convex This rather angulate condition agrees with the other species of *Propedies*

Type — ♂, Kampo Knip, Curaçao, D W I VII, 8, 1922 (H B Baker) [Acad Nat Sci Phila, Type no 5567]

Size small, length of body nine millimeters Tegmina minute rounded pads extending but a short distance over the metanotum

Antennae cylindrical Eyes very prominent and relatively large Fastigium strongly declivent, and rounding into frontal costa, interocular space very narrow with two longitudinal adjacent carinae which diverge on the fastigium between the prominent lateral ocelli and then converge slightly to join the carinae of the frontal costa Face moderately retreating, median, longitudinal portion of frontal costa slightly impressed with lateral carinae not prominent

Dorsum of pronotum cut by three transverse sulci; lateral margins only defined by the dark bands of the lateral lobes having no carinae or angle formed there, caudal margin transverse with median point broadly emarginate Tegmina very small lobiform pads not extending beyond the middle of the metanotum

Apex of abdomen not especially swollen, cerci straight extending dorsad about the length of supra-anal plate, rather broad proximad and tapering to a fine point, supra-anal plate shield shaped, as broad as long, furculae small adjacent processes, subgenital plate rather small, moderately upturned, free margin extending straight to apex in lateral aspect, apex narrowly rounded in dorsal aspect Hind femora with a dorso-median spine at the apex Hind tibiae with eight spines on the external row The apical tarsal segment is longer than the proximal.

Allotype — ♀, same data as type [Acad Nat Sci Phila.]

Similar in general to the male, but decidedly larger and the eyes are proportionately not as prominent

Coloration General color of females dull brown, the males are considerably paler and have a broad longitudinal, dark brown band on the dorsal half of the lateral lobes of the pronotum and which extends on the head to the eyes The ventral portion of the lateral lobes is dull white. This coloration is not apparent in the females

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[20] This small size and depauperate condition is not of much significance, however, when we consider that most of the other species found on these islands as *Scyllina cyanipes* and *Lactista pulchripennis* show this tendency

[21] Cf Hebard, Konowia, X, Heft 4, p 275, 1931

Measurements (Type and allotype) Length of body ♂ 9, ♀ 14 5; length of antennae ♂ 5, ♀ 5, length of pronotum ♂ 2, ♀ 3, length of tegmina ♂ 0 3, ♀ 0 3, length of hind femora ♂ 6, ♀ 9 mm

In addition to the type and allotype we have 16 ♂ and 3 ♀ paratypes with same data as the type

EXPLANATION OF TEXT-PLATE AND PLATES 13, 14

TEXT-PLATE

Fig 1—*Tylotettix pygmaeus,* new species Female (type) San Esteban, Venezuela Lateral aspect of head (Much enlarged)

Fig 2—*Tylotettix pygmaeus,* new species Female (type) San Esteban, Venezuela Frontal aspect of head (Much enlarged)

Fig 3—*Meridacris diabolica,* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 12,000 ft Dorsal aspect of apex of abdomen (Much enlarged)

Fig 4—*Meridacris diabolica,* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 12,000 ft Lateral aspect of left cercus (Greatly enlarged)

Fig 5—*Meridacris subaptera,* new species Male (type) Merida, Venezuela Dorsal aspect of apex of abdomen (Same scale as fig 3)

Fig 6—*Meridacris subaptera,* new species Male (type) Merida, Venezuela Lateral aspect of left cercus (Same scale as fig 4)

Fig 7—*Oreophilacris paramonus* new species Male (type) Paramo de Rosas, Venezuela, elevation 10,400 Dorsal aspect of apex of abdomen (Same scale as fig 3)

Fig 8—*Pediella colorata,* new species Male (type) San Pablo, Venezuela, elevation 3000 m Dorsal aspect of apex of abdomen (Same scale as fig 3)

Fig 9—*Timotes parvum,* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft Lateral aspect of head (Much enlarged)

Fig 10—*Timotes parvum* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft Lateral aspect of left cercus (Same scale as fig 4)

Fig 11—*Timotes affinis,* new species Male (type) Merida, Venezuela Lateral aspect of head (Much enlarged)

Fig 12—*Timotes affinis,* new species Male (type) Merida, Venezuela Lateral aspect of left cercus (Same scale as fig 4)

Fig 13.—*Chibchacris carrikeri,* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft Lateral aspect of left cercus (Same scale as fig 4)

PLATE 13

Fig 14—*Cauratettix gracilis,* new species Female (type) Maripa, Rio Caura, Venezuela Dorsal aspect (× 2¼)

Fig 15.—*Cauratettix gracilis,* new species Female (type) Maripa, Rio Caura, Venezuela Lateral aspect (× 2¼)

Fig 16.—*Meridacris diabolica,* new species Male (type) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 12,000 ft Lateral aspect (× 2¼)

Fig 17—*Meridacris diabolica,* new species Female (allotype) La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 12,000 ft Dorsal aspect (× 2¼)

Fig. 18.—*Oreophilacris paramonis*, new species. Male (type). Paramo de Rosas, Venezuela, elevation 10,400 ft. Lateral aspect. (× 2¼.)

Fig. 19.—*Oreophilacris paramonis*, new species. Male (type). Paramo de Rosas, Venezuela, elevation 10,400 ft. Dorsal aspect. (× 2¼.)

Fig. 20.—*Pediella colorata*, new species. Male (type). San Pablo, Venezuela, elevation 3000 m. Lateral aspect. (× 2¼.)

Fig. 21.—*Pediella colorata*, new species. Male (type). San Pablo, Venezuela, elevation 3000 m. Dorsal aspect. (× 2¼.)

PLATE 14

Fig. 22.—*Timotes parvum*, new species. Female (allotype). La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft. Dorsal aspect. (× 2⅓.)

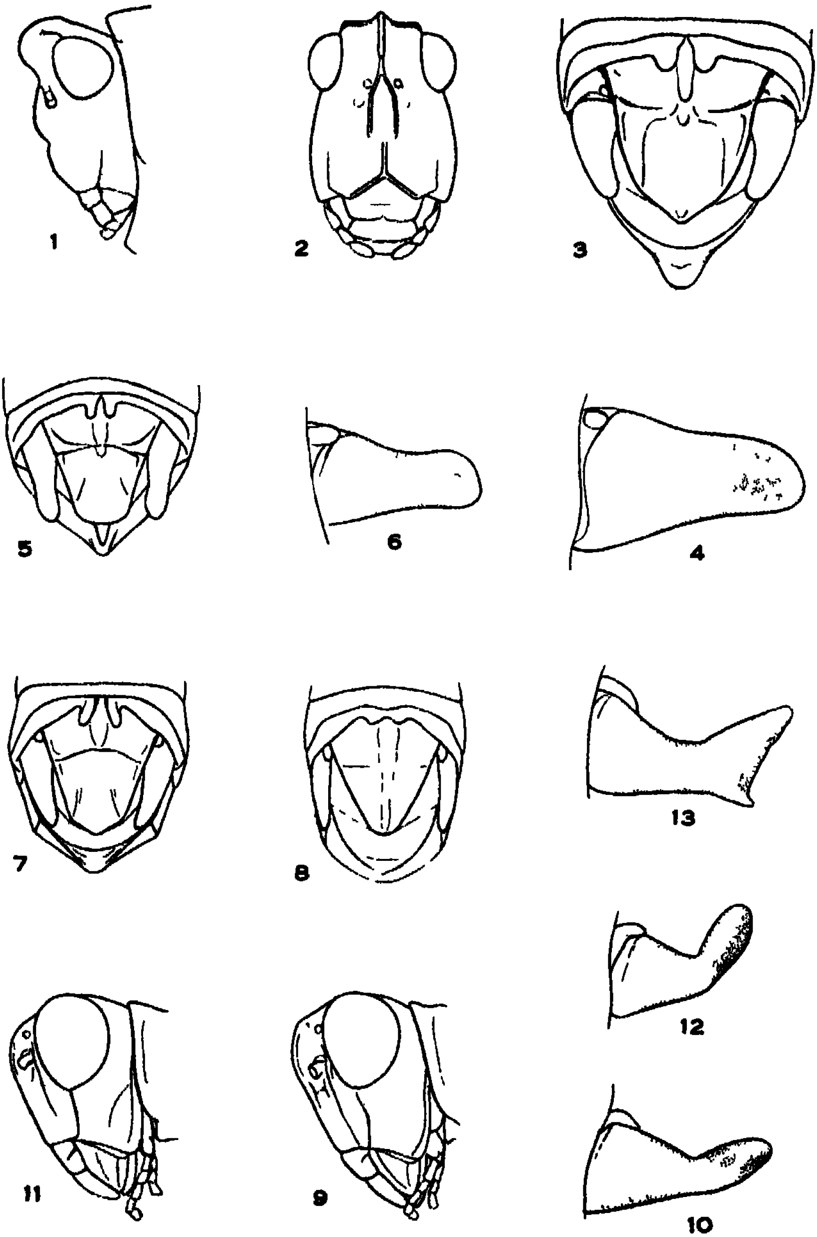
Fig. 23.—*Timotes affinis*, new species. Female (allotype). Merida, Venezuela. Dorsal aspect. (× 2¼.)

Fig. 24.—*Propedies minutus*, new species. Male (type). Kampo Knip, Curaçao. Lateral aspect. (× 4.)

Fig. 25.—*Propedies minutus*, new species. Female (allotype). Kampo Knip, Curaçao. Dorsal aspect. (× 3⅓.)

Fig. 26.—*Chibchacris carrikeri*, new species. Male (type). La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft. Lateral aspect. (× 2⅓.)

Fig. 27.—*Chibchacris carrikeri*, new species. Male (type). La Teta de Niquitao, Cordillera de Merida, Venezuela, elevation 10,000 ft. Dorsal aspect. (× 2¼.)



Roberts Text Plate

ZOOLOGICAL RESULTS OF THE GEORGE VANDERBILT AFRICAN EXPEDITION OF 1934. PART VIII.—LEPIDOPTERA, RHOPALOCERA.

BY EZRA T CRESSON, JR

The series of butterflies taken by the expedition numbers 227 specimens, and represents 35 genera and 89 species or forms None of the latter is considered new although some exhibit variations which seem to warrant noting In many instances only the species name is given, although probably represented by one or more of the so-called varieties, forms or aberrations which could not be definitely determined from the small series at hand

The material was secured for the most part by Mr James A G Rehn, the general zoologist of the expedition, and he has given brief descriptions of the more important collecting stations, and a route map, in part I of this series[1] To this the student is referred for information on these points

Of the families Lycaenidae and Hesperiidae, only a comparatively small number of specimens, thirty-one, were secured I did not attempt to make any determinations in these difficult groups, apparently represented by nineteen species

Two comprehensive works on the butterflies covering the greater portion of the regions from which this material was secured have been published. The one on the "Lepidoptera of the Congo, being a Systematic List of the Butterflies and Moths Collected by the American Museum of Natural History Congo Expedition", by Dr W J Holland,[2] is a very complete and valuable reference work The other, not completed to date, is by Dr V G L van Someren on "The butterflies of Kenya and Uganda"[3] These two, with Seitz' "Macrolepidoptera of the World", Vol XIII, by Dr C Aurivillius, were the principal works used by the writer, with constant reference to original descriptions All bibliographical citations have been checked with originals.

DANAIDAE

Danais chrysippus (Linnaeus)

1758 [*Papilio*] *chrysippus* Linnaeus, Syst Nat, (10), p 471

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 11, 1934, 1 ♀.

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[1] Proc Acad Nat Sci Phila, LXXXVIII, pp 1–14, (1936)

[2] Bull Am. Mus Nat Hist., XLIII, pp 109–369, pls 6–14, (1920)

[3] Jour. E. Afr. & Uganda Nat Hist Soc, VI, pp 22–43, 105–145 (1925), VII, pp. 61–89, 213–243, (1926), VIII, pp 29–42, 57–69, 111–156, (1927–28), IX, pp 3–54, (1928); X, pp 15–38, 141–172, (1930–31); XII, pp 59–89, 147–199, (1934–35).

Danais chysippus alcippus (Cramer)

1777 [*Papilio*] *alcippus* Cramer, Pap Exot, II, p 45, pl 127, figs E, F

Vube, Uele District, Belgian Congo, elev 2850 ft, September 14–19, 1934, 2 ♂

Danais petiverana Hewitson

1857 *Danais limniace* var *petiverana* Hewitson, Gen Diurn Lep, p 93, pl 12, fig 1

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft; August 15, 1934, 1 ♀

Amauris nivavius (Linnaeus)

1758 [*Papilio*] *niavius* Linnaeus, Syst Nat, (10), p 470

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 11 and 15, 1934, 4 ♂

Amauris damocles (Palisot de Beauvois)

1805 *Papilio damocles* Palisot de Beauvois, Ins Rec Afr et Amer, p 239, Lep. pl 6, figs 3a, 3b

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 3 ♂.

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev 2800 ft, September 15, 1934, 1 ♂

One of the specimens from the first named locality has merely a small white spot in the base of the cell of H W, another has only the apex of the cell black These two do not have any white submarginal spots on the H.W, and may be considered typical The remaining two have the cell entirely white and distinct submarginal spots, and thus may be considered ab *psyttalea* Ploetz

Amauris egialea (Cramer)

1779 [*Papilio*] *egialea* Cramer, Pap Exot, II, p 146, pl 192, fig D
1911 *Amauris egialea* Aurivillius, Seitz Macrol, XIII, p 79, fig 25c

Kisubi Mission, near Kitala, Uganda, August 15, 1934, 1 ♂.

This specimen is the aberrant form mentioned and figured in Seitz from Uganda It is characterized by the subbasal yellowish area of H W. extending to the costal margin, not limited by vein VII

Amauris echeria jacksoni E Sharpe

1891 *Amauris jacksoni* E Sharpe, Proc Zool Soc Lond, 1891, p 633, pl 48, fig 2.

Kisubi Mission, near Kitala, Uganda, August 9, 10, 15, 1934, 3 ♂

Amauris albimaculata hanningtoni Butler

1888 *Amauris hanningtoni* Butler, Proc Zool Soc Lond, 1888, p 91

Kisubi Mission, near Kitala, Uganda; August 15, 1934; 1 ♂.

ACRAEIDAE

Acraea jodutta (Fabricius)

1793 [*Papilio*] *jodutta* Fabricius, Ent Syst, III, (1), p 175

Kisubi Mission, near Kitala, Uganda, August 15, 1934, 1 ♀

This is probably form *dorotheae* E Sharpe

Acraea penelope Staudinger

1896 *Acraea penelope* Staudinger, Deut Ent, Zeit Iris, IX, p 195

Kisubi Mission, near Kitala, Uganda, August 15, 1934, 1 ♀

Nola, Kade-Sanga District, Middle Congo, October 30, 1934, 1 ♀

Acraea peneleos Ward

1871 *Acraea peneleos* Ward, Ent Mo Mag, VIII, p 60

Nola, Kade-Sanga District, Middle Congo, October 30, 31, 1934, 7 spms

Kisubi Mission, near Kitala, Uganda, August 15, 1934, 2 spms

Acraea orina Hewitson

1874 *Acraea orina* Hewitson, Ent Mo Mag, XI, p 130

Saidi's Village, Kibali-Ituri District, Belgian Congo, September 5, 1934, 1 ♂

Acraea vesperalis Grose-Smith

1890 *Acraea vesperalis* Grose-Smith, Proc Zool Soc London, 1890, p 466

Nola, Kade-Sanga District, Middle Congo, October 30, 1934, 1 ♂

Acraea encedon (Linneaus)

1758 [*Papilio*] *encedon* Linnaeus Sys Nat, (10) p 488

Athi River Crossing, Machakos-Kitui District, Kenya, July 25, 1934, 1 ♂

This specimen agrees very well with the figure given in Seitz,[4] except that the black discal spot in cell II is more basad, almost opposite base of vein III In color, it is probably form *infuscata* Staudinger

Vube, Uele District, Belgian Congo, September 17, 1934, 1 ♀

In color, this female is more typical than the male from Kenya The interneural marginal streaks of H W are yellow, not blackish Expanse 58 mm

Acraea pharsalus Ward

1871 *Acraea pharsalus* Ward, Ent Mo Mag, VIII, p 81

Kisubi Mission, near Kitala, Uganda; August 15, 1934, 1 ♂

Acraea bonasia (Fabricius)

1775 [*Papilio*] *bonasia* Fabricius, Syst Ent p 464

Nola, Kade-Sanga District, Middle Congo, November 1, 1934, 1 ♂

This is the form *banka* Eltringham,[5] having the black dots on H W beneath more or less united, forming a proximo-median band

Acraea acerata Hewitson.

1874 *Acraea acerata* Hewitson, An Mag Nat Hist, (4), XIII, p 381
1913 *Acraea acerata* f *vinidia*, Aurivillius, Seitz Macrol, XIII, p 264, fig 56a

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[4] Macrolep, XIII, fig 56e

[5] Trans Ent Soc Lond., 1912, p 226

Kisubi Mission, near Kitala, Uganda; August 15, 1934; 2 spms.

Nijana Farm, Kibali-Ituri District, Belgian Congo, September 1, 1934; 1 spm.

These specimens are the form *viridia* Hewitson.

Acraea terpsichore (Linnaeus)

1758 [*Papilio*] *terpsichore* Linnaeus, Syst Nat, (10), p 466

Kisubi Mission, near Kitala, Uganda, August 11, 15, 1934, 5 ♂

Among these is a small specimen, 35 mm expanse, with the subapical yellow spot not separated, but the marginal band sharply and irregularly defined, with yellow spots. This is probably the variety *ventura* Hewitson

30 kilometers east of Kribi Cameroons, November 24, 1934; 3 ♀.

These have the upper surfaces of wings strongly suffused with smoky-brown except the conspicuous subapical white spot and the yellow marginal spots In one specimen the discal pale band of H W is quite prominent, of paler color than the basal spotted area

Acraea rangatana Eltringham

1912 *Acraea terpsichore* f *rangatana* Eltringham, Trans Ent Soc Lond, 1912, p 247, pl 5, fig 2

1926 *Acraea rangatana* Van Someren, Jour East Afr & Uganda Nat Hist Soc., VII, p 88 and 213, pl 16, figs 1–11

Southwest side of Mount Kenya, South Nyeri District, Kenya, elev. 7000 ft, July 13, 1934, 3 ♀

These specimens agree well with Van Someren's figures but the pale median band of H W beneath is broader and less angular at cells III and VI

The species was described as a form of *terpsichore*, from two males, type localities, "Rangatan and Laitsipia, British East Africa". It is apparently not a common species but Van Someren records it as swarming "along the banks of the Kiteri River on the Kinangop" in April, 1926, and states that the species occurs on the high plateau of the Kinangop and Aberdares to Laikipia, and along the Mau to Lumbwa", in Kenya I am giving this form specific rank as a species belonging to the *goetzei*-group.

Acraea kraka Aurivillius

1893 *Acraea kraka* Aurivillius, Ent Tidskr, XIV, p. 272, pl 6, fig 3.

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev 2800 ft, September 5, 1934; 1 ♀.

Acraea quirinalis Grose-Smith.

1900 *Acraea quirinalis* Grose-Smith, Nov, Zool, VII, p 544

Saidi's Village, Kibali-Ituri District, Belgian Congo; elev. 2800 ft, September 10, 1934, 1 ♂.

Kisubi Mission, near Kitala, Uganda; elev. 3750–3900; August 15, 1934, 1 ♂.

SATYRIDAE

Mycalesis mandanes Hewitson

1873 *Mycalesis mandanes* Hewitson, Ill Exot Butt, V, Mycalesis, pl 9, figs 61, 62, [p 58, pl 31, figs 61, 62]

Kisubi Mission, near Kitala, Uganda, elevation 3750–3900 feet, August 15, 1934, 1 ♂

Mycalesis golo Aurivillius ?

1893 *Mycalesis golo* Aurivillius, Ent Tidsk, XIV, p 267, fig 2

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 feet, August 15, 1934, 3 ♂, 1 ♀

These specimens are more or less worn and a satisfactory determination is difficult In addition there seem to be considerable variation in the series, and as I have no authentically named material in this group I query this determination

Mycalesis funebris (Guerin)

1844 *Satyrus funebris* Guerin, Icon Regn Anim, Ins, p 488

Kisubi Mission, near Kitala, Uganda, elev. 3750–3900, August 15, 1934, 1 ♂

Henotesia perspicua (Trimen)

1873 *Mycalesis perspicua* Trimen, Trans Ent Soc Lond, 1873, p 104, pl 1, fig 3

Njiana Farm, Kibali-Ituri District, Belgian Congo, elev 3500 ft, September 1, 1934, 1 ♂

Ypthima albida Butler

1888 *Ypthima albida* Butler, Proc Zool Soc Lond, 1888, p 59

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♂

Ypthima asterope (Klug)

1832 *Hipparchia asterope* Klug, Symb Phys, Ins, III, [p 38], pl 29, figs 11-14

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 3 ♂

NYMPHALIDAE

Argynnis hanningtoni Elwes

1889 *A[rgynnis] hanningtoni* Elwes, Trans Ent Soc Lond, 1889, p 558

West side of Mount Kenya, North Nyeri District, Kenya, elev. 7800 ft, July 13, 1934; 2 ♂.

Antanartia delius (Drury).

1782 [*Papilio*] *delius* Drury, Ill Exot Ent., III, p 18, pl. 14, figs 5, 6

30 kilometers east of Kribi Cameroons, November 24, 1934, 1 ♂

Antanartia hippomene (Huebner)

1806. *Hypanartia hippomene* Huebner, Samm Exot Schmett, II, pl 25, [pl 238].

West side of Mount Kenya, North Nyeri District, Kenya, elev 7800 ft ; July 12, 1934, 1 ♀

Pyrameis cardui (Linnaeus)

1758 [*Papilio*] *cardui* Linnaeus, Syst Nat, (10), p 475

West side of Mount Kenya, North Nyeri District, Kenya, elev 7800 ft , July 10, 1934, 1 ♂, 1 ♀

Junonia cleia (Cramer)

1775 *Papilio cleia* Cramer, Pap Exot, I, p 23, pl 21, figs E, F

West side of Mount Kenya, North Nyeri District, Kenya, elev 7800 ft , July 10, 1934, 1 ♀

Junonia cebrene Trimen

1870 *Junonia cebrene* Trimen, Trans Ent Soc Lond, 1870, p 353

Maji ya Moto, Molo River, Kenya, elev 3250 ft , June 18, 1934, 2 ♀

Precis stygia Aurivillius

1888 *S[alamis] ethra* Staudinger (nec Feisth), Exot Schmett, I, p. 102, pl 38
1894 *Precis stygia* Aurivillius, Ent Tidsk, XV, p 275

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft , October 30, 1934, 1 ♂

Precis stygia gregorii (Butler)

1894 *Junonia gregorii* Butler, Proc Zool Soc Lond, 1895, p 726, pl 42, figs 7, 8

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft., August 15, 1934, 1 ♂

Precis stygia fuscata Holland.

1920 *Precis stygia fuscata* Holland, Bull Am Mus Nat Hist, XLIII, p 148, pl 7, fig 5.

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft , August 15, 1934, 1 ♂ .

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft , October 30, 1934, 1 ♂

This species was described from the northeastern part of the Belgian Congo, but the two specimens before me seem to agree with Holland's description and figure, except that the one from Kisubi Mission is like the *gregorii* form without the white spot on H W beneath

Precis terea (Drury)

1773 [*Papilio*] *terea* Drury, Ill Exot Ent II, p 32, pl 18, figs 3, 4

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft ; August 15, 1934, 2 spms

Ekibondo's Village, between Dingba and Dunga, Uele District, Belgian Congo, elev 2650 ft , September 23, 1934, 1 spm

Nola, Kade-Sanga District, Middle Congo; elev 1300 ft , October 30, 1934, 1 spm.

Salamis temora Felder

1867 *Salamis temora* Felder, Reise Novara, Lep, p 404

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft, October 31, 1934, 1 ♂ ?

Eurytela hiarbas (Drury)

1782 [*Papilio*] *hiarbas* Drury, Ill Exot Ent, III, p 17, pl 14, figs 1, 2

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♂, 1 ♀.

The male is black, with the white band of F W almost reaching vein V, and which is almost 6 mm wide on H W There are reddish lunules at the termen of both wings The female is brownish with the white bands broader.

Neptidopsis ophione (Cramer)

1777 [*Papilio*] *ophione* Cramer, Pap Exot, II, p 27, pl 114, figs E, F

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft, October 30, 1934, 1 spm

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 spm

The Nola specimen is very dark, almost black in the fuscous areas The other is more brownish

Ergolis enotrea (Cramer)

1779 [*Papilio*] *enotrea* Cramer, Pap Exot III, p 73, pl 236, figs A, B

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 3 ♂

Ergolis actisanes Hewitson

1875 *Ergolis actisanes* Hewitson, Ent Mot Mag, XI, p 183

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♂

Byblia ilithyia (Drury)

1773 [*Papilio*] *ilithyia* Drury, Ill Exot Ent, II, p 29, pl 17, fig 1–2

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft; November 1, 1934, 1 ♂

Athi River Crossing, Mahakos-Kitui District, Kenya, elev 1400 ft, July 25, 1934, 1 ♂

These may belong to one or two of the several forms of this species, which I am unable to satisfactorily distinguish The Nola specimen is darker above, with H W beneath ochraceous, without brown bands, and the pale submarginal band is broken up into well separated, ovate spots.

The other specimen is lighter above, but H W beneath with a subbasal, narrow disto-median band and the distal half of the pale marginal band, cocoa-brown, the latter band composed of narrowly separated spots.

Cyrestes camillus (Fabricius)

1781 *Papilio camellus* Fabricius, Spec Ins., II, p 11

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft, October 29, 30, 1943, 3 spms

These are of the darker form with the stripes blackish or broadly black margined.

Neptis metella Hewitson

1850 *Neptis metella* Hewitson, Gen Diurn Lep, p 272, pl 35, fig 2

Kisubi Mission, near Kitala, Uganda; elev 3750–3900 ft., August 15, 1934, 1 spm.

Neptis marpessa Hopffer

1855 *Neptis marpessa* Hopffer, Berichte K Preuss Akad Wissen Berlin, 1855, p 640

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 spm

Neptis seeldrayersi Aurivillius

1896 *Neptis seeldrayersi* Aurivillius, Ent Nachr, 1895, p 379

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 spm.

Nola, Kade-Sanga District, Middle Congo, elec 1300 ft, October 31, 1934, 1 spm

These two specimens seem to be the same species The Nola individual is more intensely black than the other, and has an expanse of 46 mm against 38 mm of the Kitala specimen

This species seems to be distinguished from *agatha* (Stoll) by having oblique white stripes in the cell of F.W beneath, while that species has distinctly isolated spots in this cell

Neptis strigata Aurivillius

1894 *Neptis bifra* Ward? var *strigata* Aurivillius, Ent Tidsk, XV, p 284, fig 10

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934; 1 spm

The streak in the F W cell is not divided, which character is noted by Holland [6]

Neptis melicerta (Drury)

1773 [*Papilio*] *melicerta* Drury, Ill Exot Ent, II, p 34, pl 19, figs 3, 4

Kisubi Mission, near Kitala, Uganda; elev 3750–3900 ft, August 15, 1934, 3 spms.

Pseudacraea lucretia (Cramer)

1775 [*Papilio*] *lucretia* Cramer, Pap Exot, I, p. 71, pl 45, figs. C D.

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[6] Bull. Am Mus Nat. Hist, XLIII, p 163, 1920

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934; 2 ♂, 3 ♀

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev 2800 ft.; September 10, 1934, 1 ♂ ?

The last mentioned specimen is larger than those from Kitala, 70 mm expanse, and more intensely black, the marginal band of H W beneath is ochraceous, more in tone with the basal area, the veins and interneural stripes more prominent

Aterica galene (Brown)

1776 [*Papilio*] *galena* Brown, New Ills Zool., p 94, pl 37

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 4, 15, 1934, 2 ♂

These specimens have the spots in F W. white and the yellowish spot in H W broad including bases of cells III and V, the two black dots in the cell of H W beneath are fused together

Euphaedra uganda Aurivillius

1895 *Euphaedra uganda* Aurivillius, Ent Nachr, XXI, p 380
1934 *Euphaedra uganda uganda* (Aurivillius) Van Someren Jour East Afr & Uganda Nat Hist Soc, XII, p 68, pl 7, fig 3

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♀

This is a dark female showing but faintly the metallic blue or purple suffusion The subapical white bar is very little expanded distad in cells III and IV as is shown in Van Someren's figure This band, however, is broader and less sharply defined than in *preuss* Staeger

Cymothoe reinholdi (Ploetz)

1880 *H*[*arma*] *reinholdi* Ploetz, Stett Ent Zat, XLI, p 194

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev 2800 ft, September 4, 1934, 1 ♂

This specimen agrees with Aurivillius' figure in his Rhopalocera of Ethiopia,[7] except that the distal limit of the darker basal area of H W beneath about corresponds to that of the dark gray of upper surface F W. and H W above without distinct distal marginals, submarginal lunules of H W. less marked.

Cymothoe caenis (Drury)

1773. [*Papilio*] *caenis* Drury, Ill Exot Ent, II, p 33, pl 19, figs 1, 2

Nola, Kade-Sanga District, Middle Congo, elev 1300 ft, November 1, 1934; 1 ♂.

Cymothoe coccinata (Hewitson).

1874. *Harma coccinata* Hewitson, Ill Exot Butt., V, Harma, pl 6, figs 24–26, [p 41, pl 22, figs 24–26]

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[7] Rhop Aethiop, pl 4, fig. 6, 1898

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev. 2800 ft.; September 4, 1934, 1 ♂.

Charaxes etheocles (Cramer)

1777 [*Papilio*] *etheocles* Cramer, Pap. Exot., II, p. 34, pl. 119, figs. D, E.

Epulu River Ferry between Mambasa and Avakubi, Kibali-Ituri District, Belgian Congo, elev. 2500 ft., September 3, 1934, 1 ♂.

This is the form *hollandi* Butler.[8]

Avakubi, Kibali-Ituri District, Belgian Congo, (Baron von Blixen), September 15, 1934, 1 ♂.

This is the form *ephyra* (Godart).[9]

Charaxes eupale (Drury)

1782 [*Papilio*] *eupale* Drury, Ill. Exot. Ent., III, p. 7, pl. 6, fig. 3.

Avakubi, Kibali-Ituri District, Belgian Congo, (Baron von Blixen), September 15, 1934, 1 ♂.

Ekibondo's Village, between Dingba and Dungu, Uele District, Belgian Congo, elev. 2650 ft., September 29, 1934, 1 ♀.

Nola, Kade-Sanga District, Middle Congo, elev. 1300 ft., October 30, 1934, 1 ♂.

Charaxes paphianus Ward

1871 *Charaxes paphianus* Ward, Ent. Mo. Mag., VIII, p. 120.

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 1 ♂.

LIBYTHEIDAE

Libythea labdaca Westwood

1851 *Libythea labdaca* Westwood, Gen. Diurn. Lep., p. 413, pl. 68, fig. 6.

Nola, Kade-Sanga District, Middle Congo, elev. 1300 ft., October 29, 30, 31, 1934, 10 spms.

PIERIDAE

Appias sylvia form **perlucens** (Butler)

1898 *Phrissura perlucens* Butler, Trans. Ent. Soc. Lond., 1898, p. 431.

Nola, Kade-Sanga District, Middle Congo, October 29, 1934, 2 ♂.

Bomokandi River Ferry, near Rungu, Uele District, Belgian Congo, elev. 2350 ft., September 21, 1934, 1 ♂.

These specimens are very well described by Butler, but there is no evidence of the border on F.W. beneath being "yellowish externally."

Appias sabina (Felder)

1865 *Pieris sabina* Felder, Reise Novara, Lep., p. 167.

Nola, Kade-Sanga District, Middle Congo, October 30, 31, and November 1, 1934; 5 ♂.

These specimens have, at most, only a tinge of yellow at base of F.W.

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[8] Ann. Mag. Nat. Hist., (6), XII p. 266, 1893.

[9] Ency. Meth., Iris, IX, p. 355, 1813.

Anaphels mesentina (Cramer)

1780 [*Papilio*] *mesentina* Cramer, Pap Exot, III, p 140, pl 270, figs A, B

West side of Mount Kenya, North Nyeri District, Kenya, elev 7800 ft., July 10, 13, 1934, 5 ♂, 3 ♀

Anapheis creona severina form **infida** (Butler)

1888 *Belenois infida* Butler, Proc Zool Soc Lond, 1888, p 78

Kasenyi, Lake Albert, Kibali-Ituri District, Belgian Congo, August 25, 26, 1934, 2 ♂, 1 ♀

One of these males is like the figure of this form by Butler,[10] but the white marginal spots of F W above are present in cells II, III and IV Beneath, the costa of these wings are not black proximad of the discocellular bar, and not at all or slightly so in the cell, there is some sulphur-yellow tinge basally Hind wings beneath with slightly broader marginal band than in the figure The other male has F W above with rounded discal spot connected by a line to a large costal spot, beneath there is a distinct isolated white marginal spot in cell II

The female I associate here has the pale basal area of both wings above strongly suffused with black, leaving only the costal area, distal half of the cell and base of cell II, paler, apical marginal light spots scarcely appreciable Beneath, F W yellowish toward anal margin, white marginal spots limited to three at apex, H W marked similar to Butler's figure, but of less distinctness and the pale areas white

Belenois theora (Doubleday)

1846 *Pi[eris] theora* Doubleday Ann Mag Nat Hist, (1), XVII, p 25

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 1 ♂.

Belenois theora lortzingi (Suffert)

1904 *Pieris lortzingi* Suffert, Deut Ent Zeit Iris, XVII, p 79

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 4 ♂, 1 ♀.

Belenois theuszi (Dewitz)

1889 *Pieris theuszi* Dewitz, Ent Nachr, XV, p 107, pl 2, figs 6–9

Nola, Kade-Sanga District, Middle Congo, October 30, 31, 1934, 2 ♂

Mylothris chloris clarissa Butler

1888 *Mylothris clarissa* Butler, Proc Zool Soc Lond, 1888, p 70

Kasenyi, Lake Albert, Kibali-Ituri District, Belgian Congo, August 27, 1934; 1 ♀

Mylothris rhodope (Fabricius)

1775 [*Papilio*] *rhodope* Fabricius, Syst Ent, p 473

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♂

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[10] Proc Zool Soc Lond, 1894, pl 37, fig 1

Nina medusa form immaculata (Aurivillius)

1895 *Nychitona medusa* var *immaculata* Aurivillius, Ent Tidsk, XVI, p. 287

Kisubi Mission, near Kitala, Uganda, elev. 3750–3900 ft., August 15, 1934; 2 ♂, 1 ♀

Colotis chrysonome (Klug).

1829 *Pontia chrysonome* Klug, Symb Phys, Ins, III, [p 28], pl 7, fig 11, ♀

Maji ya Moto, Molo River, Kenya, elev 3250 ft, June 6, 1934, 1 ♀

Between Nanyuki and Upper Guaso Nyero River, North Nyeri District, Kenya, elev 6000 ft.; July 6, 1934, 1 ♀

Nepheronia argia (Fabricius)

1775 [*Papilio*] *argia* Fabricius, Syst Ent, p 470

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft, August 15, 1934, 1 ♂

Nola, Kade-Sanga District, Middle Congo, November 1, 1934; 1 ♂

Nepheronia thalassina (Boisduval)

1836 *Pieris thalassina* Boisduval, Spec Gen Lep, I, p 443

Nola, Kade-Sanga District, Middle Congo, October 30, 1934; 1 ♂

Colias electo (Linnaeus).

1763 *Papilio electo* Linnaeus, Amoen Acad, VI, p 405

West side of Mount Kenya, North Nyeri District, Kenya, elev 7800 ft, July 13, 1934, 2 ♀

Catopsilia florella (Fabricius)

1775 [*Papilio*] *florella* Fabricius, Syst Ent, p 479

West side of Mount Kenya, North Nyeri District, Kenya, elev. 7800 ft, July 10, 1934; 1 ♂, 3 ♀.

Two of the females are ab *hybaea* Boisduval, the other is ab *pyrene* Swainson.

Terias hecabe senegalensis Boisduval

1836 *Terias senegalensis* Boisduval, Spec Gen Lep, I, p 672

Nola, Kade-Sanga District, Middle Congo, October 29, 30, 31, November 1, 1934, 9 ♂

Seven of these specimens have distinct dentures in the terminal band at vein II of F W and the under surfaces of both wings are lightly dotted Another specimen has the denture relatively small and the under surfaces more heavily dotted Another male, very small, 30 mm. expanse, has very small, just perceptible denture and is faintly dotted beneath.

Kisubi Mission, near Kitala, Uganda; elev 3750–3900 ft.; August 15, 1934, 2 ♂.

One of these specimens has a very small denture in the black terminal band at vein II of F W. and is very lightly dotted beneath. The other specimen has a distinct denture, is distinctly marked on H W. beneath and with a subapical brown spot on F W. beneath.

Whether these specimens represent any of the named forms *brenda* Doubleday and Hewitson, *bisinuata* Butler, *ceres* Butler, and *maculata* Aurivillius, I do not determine In the small series, collected at Nola there is complete gradation in the development of the terminal band and of the intensity of the markings beneath

Terias (Maiva) brigitta form **zoe** Hopffer

1855 *Terias zoe* Hopffer, Berichte Koen Preuss Akad Wissen Berlin, 1855, p 640

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft , August 15, 1934, 1 ♂

PAPILIONIDAE

Papilio zalmoxis Hewitson.

1864 *Papilio zalmoxis* Hewitson Exot Butt , III, Papilio, pl 6, fig 18, [p 5, pl 3, fig 18]

Nola, Kade-Sanga District, Middle Congo, October 29, 1934, 2 ♂

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 2 ♂

These specimens have the upper surfaces discolored, bluish to yellowish green, probably due to fumes of the killing medium

Papilio dardanus Brown

1776 [*Papilio*] *dardanus* Brown, New Ill Zool p 52, pl 22

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft , August 15, 1934, 1 ♂

Papilio hesperus Westwood

1843 *Papilio hesperus* Westwood, Arcana Ent , I, p 189, pl 48

Nola, Kade-Sanga District, Middle Congo, October 30, November 1, 1934, 2 ♂

Papilio phorcas Cramer

1775 [*Papilio*] *phorcas* Cramer, Pap Exot , I, p 4, pl 2, figs B, C

Kisubi Mission, near Kitala, Uganda, elev 3750–3900 ft , August 15, 1934; 1 ♂ , 1 ♀

Nola, Kade-Sanga District, Middle Congo, October 30, 1934, 1 ♂

The female from Kisubi Mission is the form *thessander* Fabricius

Papilio nireus Linnaeus

1758 [*Papilio*] *nireus* Linnaeus, Syst Nat , (10), p 464

Nola, Kade-Sanga District, Middle Congo, October 27, 30, 1934, 3 ♂

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 3 ♂

Papilio bromius Doubleday.

1845 P[*apilio*] *bromius* Doubleday, Ann Mag Nat Hist , (1), XVI, p 176

Nola, Kade-Sanga District, Middle Congo; October 30, 1934; 1 ♀

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 1 ♂.

This male is perhaps variety *brontes* Godman [11] It has the medial band of F W only 8 mm. wide at inner margin of wing, its distal margin slightly crenulate, proximal margin straight, the part in the cell expanding proximad to vein III Medial band of H W 12 mm at the cell, its distal margin convex rather sharply, but not deeply dentate to vein III (somewhat as in figure of *chrapkowskii* in Seitz, III, fig 5c) then abruptly extending along that vein for 10 mm, proximal margin straight, not quite to base of vein II. Beneath, F W blackish brown, slightly lighter distally, without submarginal spots, H W more golden, particularly basally, the submarginal golden spots rounded

Papilio demodocus Esper

1798 *Pap[ilio] demodocus* Esper, Ausland Schmet, p 205, pl 51, fig 1

Kikuyu Escarpment above Kijabe, Kenya, elev 8200 ft, July 1, 1934, 1 ♂

Batangafo, Ubangi-Shari, French Equatorial Africa, December 12, 13, 1934, 1 ♀

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 1 ♂, 1 ♀

Papilio menestheus lormieri Distant

1874 *Papilio menestheus* var *lormieri* Distant, Ent Mo Mag, XI, p 129

Nola, Kade-Sanga District, Middle Congo, October 30, 1934 2 ♂

Papilio ridleyanus White

1843 *Papilio ridleyanus* White, An Mag Nat Hist, (1), XII, p 262, fig

Bomokandi River Ferry, near Rungu, Uele District, Belgian Congo, elev 2350 ft, September 21, 1934, 1 ♂

Nola, Kade-Sanga District, Middle Congo, November 1, 1934, 1 ♂

Papilio tynderaeus Fabricius

1793 [*Papilio*] *tynderaeus* Fabricius Ent Syst, III, pt 1, p 35

Nola, Kade-Sanga District, Middle Congo, October 30, 1934, 1 ♂

Papilio leonidas Fabricius

1793 [*Papilio*] *leonidas* Fabricius Ent Syst, III, pt 1, p 35

Bomokandi River Ferry, near Rungu, Uele District, Belgian Congo, elev 2350 ft, September 21, 1934, 1 ♂

Nola, Kade-Sanga District, Middle Congo, October 31, 1934, 1 ♂

Papilio ucalegon Hewitson

1865 *Papilio ucalegon* Hewitson, Ill Exot Butt, III, Papilio, pl 7, fig 19, [p 3, pl 2 fig 19]

Thirty kilometers east of Kribi, Cameroons, November 24, 1934, 1 ♂

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[11] Proc Zool Soc Lond, 1885, p 540

Papilio ucalegon var ucalegonides Staudinger

1884 [*Papilio*] *ucalegonides* Staudinger, Exot Schmet, I, p 10

Epulu River Ferry between Mambasa and Avakubi, Kibali-Ituri District, Belgian Congo, elev 2500 ft, September 3, 1934, 2 ♂

Saidi's Village, Kibali-Ituri District, Belgian Congo, elev 2800 ft, September 5, 1934, 1 ♂

Bomokandi River Ferry, near Rungu, Uele District, Belgian Congo, elev 2350 ft, September 21, 1934, 1 ♂

Papilio policenes Cramer

1775 [*Papilio*] *policenes* Cramer, Pap Exot, I, p 61, Pl 37, figs A, B

Bomokandi River Ferry, near Rungu, Uele District, Belgian Congo, elev 2350 ft, September 21, 1934, 1 ♂

Nola, Kade-Sanga District, Middle Congo, October 30, 31, 1934, 7 ♂

Thirty kilometers east of Kribi, Cameroons, November 24, 1934 3 ♂

SUMMARY

	Specimens	Species
KENYA COLONY		
Maji ya Moto River	3	2
Kivuyu Escarpment above Kijabe	1	1
Between Nanyuki and the Upper Guaso Nyiro River	1	1
West side of Mount Kenya above Naiomoru	20	7
Southwest side of Mount Kenya, seven miles northwest of Karatina	3	1
Athi River Crossing, between Kibwezi and Tkutha	1	1
UGANDA PROTECTORATE		
Kisubi Mission, near Kitala, Buganda	75	41
BELGIAN CONGO		
Kasenyi, Lake Albert, Kibali-Ituri District	4	2
Njiana Farm, near Tinda Bridge, between Bunia and Irumu, Lendu Plateau, Kibali-Ituri District	2	2
Epulu River Ferry, Irumu-Avakubi road, between Mambasa and Avakubi, Kibali-Ituri District	3	2
Saidi's Village, Irumu-Avakubi road, ten miles west of Epulu River Ferry	7	7
Avakubi, Kibali-Ituri District	2	2
Vube, five miles north of Nepoko Ferry, Avakubi-Niangara road, Uele District	3	2
Bomokandi River Ferry, near Rungu, Avakubi-Niangara road	4	4
Ekibondo's Village, between Dingba and Dungu, forty miles east of Niangara, Uele District	2	2
FRENCH EQUATORIAL AFRICA		
Batangafo, Uam-Fafa District, Ubangi-Shari	2	2
Nola, Kade-Sanga District, Middle Congo	73	21
CAMEROONS		
Thirty kilometers east of Kribi	21	11

THIRD PRELIMINARY REPORT ON THE RESULTS OF THE SECOND DOLAN EXPEDITION TO WEST CHINA AND TIBET: FOUR NEW BIRDS FROM TIBET

BY ERNST SCHAFER

In the collection of birds made on the Second Dolan Expedition to Tibet and Szechwan the following birds appear to be new

Hirundo daurica tibetana, subsp nov

Similar to *H d gephyra* (Meise) but larger A series of twenty-five *tibetana* show a wing measurement of 123 mm to 131 mm as against 120 mm to 123 5 mm for a series of twelve *gephyra* from Kansu, Sungpan, and Tatsienlu

Type Adult male A N S P , No 124761, collected 100 miles north east of Jyekundo (Dre-chu-gomba), Chinese Tibet, on June 10, 1935 by Ernst Schafer Wing 129 mm , tail 108 mm , culmen 6 5 mm

Lophobasileus elegans meissneri, subsp nov

This new race proves to be much darker on the entire upper surface than specimens of a large series from Kansu (Beick Collection, Berlin Museum) The top of the head and forehead is darker gray, the brown of the hind neck is darker and less brilliant than in Kansu birds

Type Adult male A N S P , No 125455, collected in the Malashi country south of Litang, Sikong on September 29, 1934, by Ernst Schafer Wing 56 mm

Twelve specimens were collected at Hsinolo, Hokow, and the Malashi country

Passer montanus maximus, subsp nov

This new race of Tree Sparrow from Tibet is larger than *P m kansuensis* The underparts are duller in color and are closer to *obscuratus* The bills average a little longer than *kansuensis* but are slenderer The upper mandible is more pointed, the tip very slender and bent downwards The differences in color between this new race and *kansuensis* are very slight, even with large series The main character, however, in which the two races differ is the extraordinary length of the wing in *maximus* The wing series of fifteen birds measure 74 mm to 84 mm as against 69 mm to 74 mm for seven specimens of *kansuensis* (Stresemann, Orn Monatsb. p 55, 1932)

Type Adult male A.N S P , No 124852, collected at Jyekundo, upper Yangtze river by Ernst Schafer, April 2, 1935 Wing of type 84 mm

Near Jyekundo, where we met with the last human habitations, the northernmost limit in the horizontal range of this form of Tree Sparrow is reached Here in the highest and coldest country we found the largest specimens For this reason I determined that the largest specimen should be the type

Petronia petronia jyekundensis, subsp nov

I have compared ten birds from Jyekundo with a large series from Kansu (ten males, five females), collected by Beick (Berlin Museum) and a series of five birds collected by Weigold in the southern parts of Sikong, and found the following scale of wing measurements

	males	females
jyekundensis (Jyekundo)	99–108 mm	97–100 mm
tibetana (N Kansu)	92– 99 mm	90 5– 92 mm
tibetana (Sikong)	91– 98 mm	

The high Tibetan specimens are much larger than southern Sikong birds, but the two forms cannot be distinguished in color Both are a little darker than the lighter birds from Kansu, which again show nearly the same wing length as the southern Sikong birds Meise already saw the difference in color between Kansu and Sikong birds, but did not value it with recognition by name The differences in color really are so slight that only large series show them well The Tibetan birds have darker crowns and backs

Measurements Wing 108 mm

Considering the great difference in size between Tibetan birds on one side, and Kansu and southern Sikong birds on the other, I consider all my specimens to belong to an undescribed race

Type Adult male A N S P , No 125793, collected by Ernst Schafer at Jyekundo, September 4, 1935

LEPIDOPTERA COLLECTED IN NORTHERN BRITISH COLUMBIA BY MISS JOSEPHINE DE N HENRY PART I,—RHOPALOCERA

BY JOHN W CADBURY, 3D

The collection of Lepidoptera in the Academy, as well as those located elsewhere, is singularly lacking in material from the transition areas lying between Arctic, Hudsonian, and Canadian life zones of the Nearctic Region And material from this region bearing exact and full data is especially needed The Upper Peace River District of N British Columbia is just such a place, and in the summer of 1932 Miss Josephine de N Henry accompanied her mother, Mrs J Norman Henry, into this unexplored and practically inaccessible region They were chiefly engaged in collecting plants, but Miss Henry was able to make collections of insects in several orders as well, and these, with complete data for each specimen, have been most generously presented to the Academy in their entirety It is with great pleasure that we are able, at this place, to acknowledge this gift which makes a most valuable addition to our series

For the information of those not familiar with the maps of British Columbia, and unable to refer to one, the part of the Upper Peace River District under consideration is situated between 56° and 58° N Lat and 120°–124° W Long The Peace River flows east and north to Athabasca Lake in Alberta and thence north into the Great Slave Lake The Halfway and Graham Rivers, from the region of which most of the butterflies came, are tributaries to the Peace, flowing into it, roughly, from the northwest—the Graham into the Halfway and the Halfway into the Peace I have seen two maps of this region, the first is the Hudson Hope, B C sheet No 94 S E of the National Topographic Series, Department of Interior Canada 1929, which includes nearly all of the country visited by the Henrys in 1932 The second is a map of northern British Columbia, No 1 H, issued by the British Columbia Department of Lands, edition of 1st May, 1933 This is a geographical map and covers the whole of British Columbia north of 55° N Lat Both of these maps were kindly loaned me by Miss Henry, and since many of the localities at which she collected are not included on either, I have reproduced part of the latter inserting the localities at her direction For this information and invaluable help I am most grateful

For a full account of the phytogeographic aspect of this region the reader is referred to the paper by Raup and the bibliography it contains[1]

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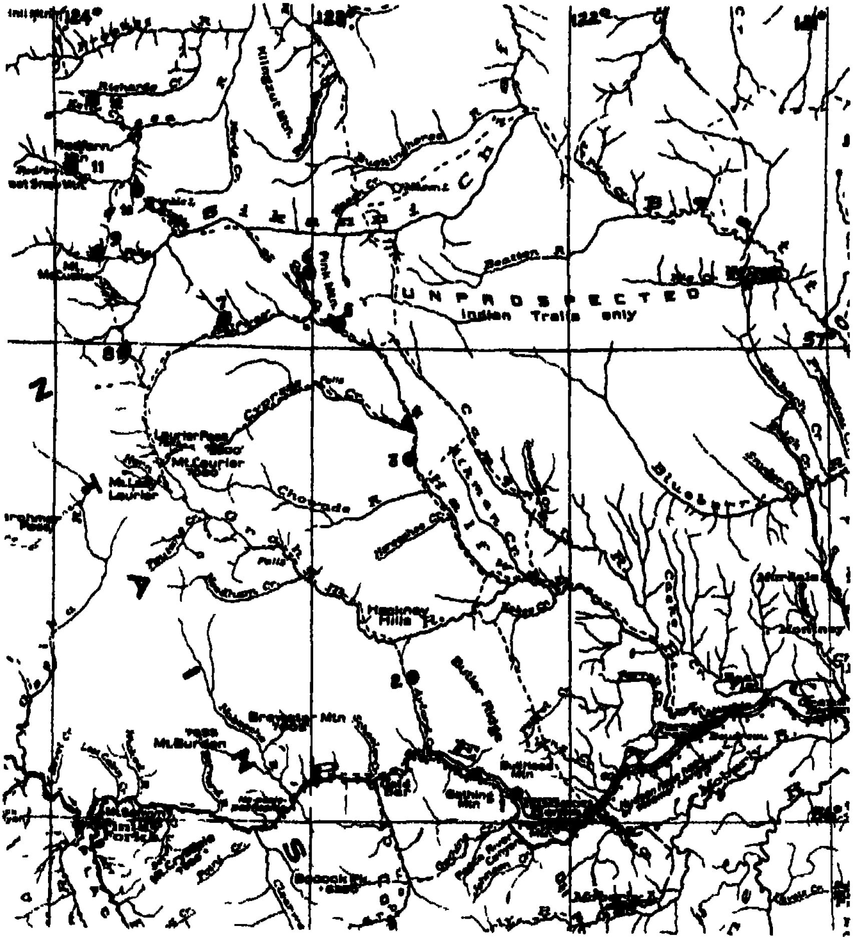
[1] Raup Phytogeographic Studies on the Peace River and Upper Liard River Regions, Canada Contrib Arnold Arboretum, 1934, pp 50-51 Also bibliography, pp 106-111

The discussion of the various types of flora over the whole Peace River basin, given by Raup, is too long and full to be reproduced here even in part, but gives a clear picture, augmented by long lists of plants, of each kind of floral habitat, ranging from the alpine meadows through the widespread muskeg or bog habitats, to the lowland forests and meadows of



Map showing localities mentioned in the text at which specimens were collected. Fig 1 "Cust's House", 2 "20 mile summit (Aylard)", 3 "Between Graham R. and Cypress Creek, Halfway R", 4 "Brady's Ranch", 5 "Pink Mtn Base", 6 "Two bit", 7 "Westergard's Cabin", 8 "Caribou Pass", 9 "Red-Bug Slough", 10. "Trimble Lake Pass", 11 "Basins N Besa R W Redfern Lake," 12 "Caribou Ridge" (From British Columbia Dept Lands Map No 1 H, 1933, "Northern British Columbia") river levels In his introduction to the floral discussions Raup summarizes the whole as follows "Beginning at high elevations in the mountains striking features are first, an alpine flora which is to a greater degree Arctic than that of more southern latitudes, second, a rather abrupt timber line marking the upper limit of a coniferous forest which, though it has many representatives of the richer Cordilleran timber, is more closely related to the widespread 'Canadian Forest' of the northern interior plains Most of the Cordilleran elements disappear suddenly east of the mountains The most notable variations from the timber of the interior plains are the parklands, or semi-open prairies which, though 'patchy' are widely distributed throughout, reaching far to the north and northeast through the central part of the Makenzie basin The flora of the prairies and forests is in general remarkably uniform over this whole region, but examination shows that a certain number of species of the high plains just east of the mountains disappear on the lower Peace Marshlands and sloughs are common everywhere, but they have their greatest development on the broad alluvial plains of the Peace-Athabaska delta, making one of the outstanding vegetational features in that part of the basin "[2]

Raup further suggests that conditions on Mt Selwyn may be considered "fairly typical" of the whole region In a diagram of the west side of this mountain the floral regions are limited as follows "Spruce-fir forest" from 2000 to 3500 ft (the mountain's base is at 2000 ft above sea level), "scrub" extends from 3500 to 4500 ft and constitutes the "timber line" He states that this is poorly defined in places, however "Meadows and shrub thickets" are shown in the lower part and "Lichens, herbs, low shrubs" in the upper part of the "Arctic-alpine" zone extending from 4500 to 7000 ft above sea-level[3]

In addition to Mr Raup's indispensable paper, Miss Henry kindly loaned me the printed account of Mrs J Norman Henry's diary for the 1931 and 1932 trips into the Peace River region For a day-to-day account of the trip it is both valuable and interesting, and, in addition, excellent photographs of nearly all the major points of interest accompany the text, and are most instructive[4]

In addition to the information mentioned from the above two sources, Miss Henry has told me, on her visits to the Academy, various facts among which one concerning the temperature is most interesting She says that even in July the thermometer drops to near or even below freezing, almost every night, and that the plants are covered with sparkling frost in the early morning hours, but appear to be entirely unaffected by the cold From this information any abnormal melanism among the butterflies would seem to be explained Travel through the region is largely accomplished on horseback and on foot, most of the rivers and streams being too swift and shallow, especially in their upper courses, to be navigated with power boats

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[2] Raup Phytogeographic studies in the Peace and Upper Liard River Regions, Canada Contrib Arnold Arboretum, 1934, pp 50-51

[3] *Ibid*, p 51, fig 2—"Diagrammatic Section of the vegetation on the Western Slope of Mt Selwyn".

[4] Henry, Mary Gibson Collecting Plants Beyond the Frontier in Northern British Columbia National Horticultural Magazine, 1934

The itinerary for the 1932 expedition is given by Mrs Henry in her diary as follows

July 14—Leave Mouth of Halfway River Follow along river
July 24—Robb Lake
July 26—Cross Caribou Pass Climb Mt Kenny
July 29—Redfern Lake
Aug 1—Climb big glacier, source of Besa River
Aug 6—Climb Mt McCusker
Aug 10—Camped on Upper Graham River
Aug 14—Crossed Aylard Summit
Aug 18—Hudson Hope

Distance covered, including climbs on foot, 570 miles

With regard to the citation of literature, those papers most frequently cited are referred to in the text with only the author's name and the date (year) of publication The full reference is given in each instance where the paper in question is referred to only occasionally [5]

The citation of additional material studied in each case and added at the end of the discussion of each species, is only partially full It is detailed only where pertinent to the purpose of the present paper That is, full data are given only for specimens coming from the same general region, geographically and faunistically speaking, for specimens taken in a remote region, but having been especially referred to for one reason or other in the discussion of the species Where specimens from a remote region are in most respects in agreement with the Henry material their data is mentioned in a general way only, i e state, province, etc Therefore, where full data appear, it is to be assumed that those specimens have been considered relevant to the subject, and, where they do not appear, irrelevant The mention of the latter is included only for the information it may afford of the general distribution furnished by the Academy's collection, and also to indicate for other workers the fact that these specimens were not ignored.

Finally, I should like to appeal to all who may consider collecting in the Peace River basin or other little-known northern territory, to exert all effort toward bringing back as large series of every species as possible While individual specimens are provocative and instructive, they cannot, or should not, furnish an adequate basis for thorough taxonomic study They do not indicate variation or extent of distribution of a species, both of which are imperative to the accomplishment of sound work The members of the Henry family, on all of their trips to the northern frontiers of British Columbia, have concentrated on the flora and have brought back collections of dried and living plants That they were able to collect insects at all is remarkable, and should stimulate others, in like position, to do so

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[5] The complete title for references cited by author and date follows Blackmore, E H Check-list of the Macrolepidoptera of British Columbia (Butterflies and Moths), Provincial Museum of Natural History, Victoria, British Columbia, 48 pp, 1927, Holland, W J, The Butterfly Book, New and Thoroughly Revised Edition , 1931

As has been pointed out, the region is situated near the zone of transition from Canadian to Hudsonian zoogeographical regions, with Arctic flora and fauna appearing at all higher elevations It is, thus, somewhat intermediate in its floral character That many of the butterflies studied are also intermediate between, say, a typical example and a distinct racial offshoot of that species, is not surprising Others appear to be intermediate between two supposedly valid species More material from this and other " intermediate " regions should prove extremely valuable in formulating a taxonomic structure which will, in the future, more accurately reflect the relationships of the butterflies of the north Some distinct species of present standing may legitimately be found to fall into racial stocks of one widely distributed species, but this cannot be proved before a far greater material is accessible

It should be stated that most of the material in the Academy's collection was determined and arranged by the late Dr Henry Skinner and the late Mr Frank Haimbach, both of Philadelphia Still other material has been similarly worked on by Mr W Judson Coxey, and others, and in not a few cases specimens have been compared and duly annotated with type and other material in the Barnes collection. With the Academy's collection and excellent library as a working base, it is to be hoped that most of the material studied has been correctly determined Where definite determination has seemed impossible, explanation appears at the appropriate place.

A report on the moths collected by Miss Henry, mostly Geometridae, Noctuidae, and Microlepidoptera, will appear at a later date.

Special acknowledgment should be made to Miss Henry for answering many questions about the region and butterflies she collected in it, and for maps and literature cited above, which she generously furnished To Mr E T Cresson, Jr and Mr James A G Rehn, of the Academy's staff, for innumerable suggestions pertaining to construction, etc of this report, I am greatly indebted Lastly, I wish to express my obligation to Mr W J. Gerhard of the Field Museum, Chicago, for his cooperation in furnishing information on Reakirt's types of *Chrysophanus mariposa*

PAPILIONIDAE

Papilio machaon aliaska Scudder

1869 *Papilio aliaska* Scudder, Proc Bost Soc Nat Hist, XII, p 407

One female labelled "Alt 4500 ft, Aug 11."

It is a freshly emerged specimen, unrubbed, and not battered It agrees with original description and comparative material

Additional material examined includes the following from Alaska 1 ♂, Bethel, Koskoquim R., 1 ♂, "Alask" Another ♂, bearing no data

Blackmore (1927) records *aliaska* from British Columbia

Parnassius smintheus nanus Neumoegen

1890 *Parnassius smintheus* var *nanus* Neumoegen, Ent Amer VI, p 61

One male taken at "Caribou Pass, alt 5300 ft, Aug 10."

It is not rubbed, but left primary is broken The specimen is as close to *nanus* as to any form of this species, is small, and with no trace of the black spot above inner margin of forewing above, common to most *smintheus* The forewing is fully scaled save the extreme apex and upper half of outer margin, therefore not *clodius* Mén

Additional material studied includes from Utah 1 ♂, "Utah", from collection of R C Williams, Jr

Nanus is recorded from British Columbia by Blackmore (1927)

PIERIDAE

In this family occur the butterflies which gave the most trouble—especially the albino females in the genus *Colias* Fabricius

Pieris[a] **occidentalis** Reakirt

1866 *Pieris occidentalis* Reakirt, Proc Ent Soc Phila, VI, p 133

One male, one female labelled "Near Westergard's Cabin on Halfway R, alt 3000 ft, July 22" One male "Basins N Besa R W Redfern Lake, alt 6000 ft, Aug 1"

The first mentioned male and female are both worn and battered, the other is fresh and in perfect condition The specimens do not differ materially from typical *occidentalis*, all are fully and normally marked

The specimens were compared with 83 additional specimens from various localities in Arizona, New Mexico, Utah, Nevada, California, Colorado, Manitoba Miniota, and Alberta Lake Louise

Blackmore (1927) records this species from British Columbia

Pieris napi pallida Scudder

1861 *Pieris pallida* Scudder, Proc Bost Soc Nat Hist., VIII, p 183

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[a] Not *Ascia* Scop See Holland (1931), p 277, Ann Carn Mus, XIX, pp 197, 200, 1930

One male labelled: "Between Graham R and Cypress Creek, Halfway R, alt 2400 ft, July 17"

It is slightly rubbed, but typical in all respects

Additional material used for comparison includes thirty-three specimens from various localities in New Mexico, California, Vancouver Island: Corfield, and Washington Olympia

Blackmore (1927) includes *pallida* in his British Columbia list

Colias[7] **hecla glacialis** McLachlan Plate 15, fig 2

1878 *Colias hecla glacialis* McLachlan, Jour Linn Soc London, XIV, p 108

One female from "Basins N Besa R W Redfern Lake, alt 6000 ft, Aug 1"

The specimen is perfect Although I have seen no specimens of this form of *hecla* Lef, several Greenland and Labrador specimens of typical *hecla* have been examined, including four females With these females Miss Henry's specimen differs in the following respects forewing above pale green-yellow at base, in cell, and on costa, the rest of wing, save normal black outer margin, pale orange In the typical females the orange color is darker and covers the entire wing, outer margin excepted In other respects the specimen under consideration agrees with *hecla hecla* Lef although it is slightly paler throughout McLachlan's description of *glacialis* is inadequate, but the Henry specimen agrees with it in so far as it goes I have been unable to find any published colored figure of *glacialis*, but tentatively place the single example here lacking conclusive evidence to the contrary For colored figures of *hecla hecla* see Holland's figures with which our series agrees[8]

Blackmore (1927) records *glacialis*, but not typical *hecla*, from British Columbia

Colias eurytheme kootenai Cockle

1910 *Colias kootenai* Cockle, Can Ent, 42, p 203

One male from "Pink Mtn Base, alt 2850 ft, July 20" Another male "Halfway R 10 mi W Two Bit, alt 3000 ft, July 21"

Both are fresh and unbroken, one is slightly rubbed, probably in capture or preparation They agree entirely with comparative material and with the inadequate original description

Additional material studied includes the following from British Columbia 1 ♂, N Westminster, 1900, (Poling) From Alaska 3 ♂, Circle, Aug., 1 ♂, Circle, no date; 1 ♂, Skagway, July 1924, (W. H Shoemaker) From Idaho: 1 ♂, Coeur d'Alene, June 25, 1900, 1 ♂, Pocatello, July 21, 1905,

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[7] Not *Eurymus* Horsf See Ann Car Mus, XIX, pp 198-200, 1930

[8] Holland (1931), pl 73, figs 22-24

(W Judson Coxey), 1 ♂, N W Idaho, July 1900, (Poling) From N W. Territory 1 ♂, 1883, (G Geddes)

Blackmore (1927) mentions *kootenai* from British Columbia

Colias eurytheme keewaydin Edwards Plate 15, fig 1

1869 *Colias keewaydin* Edwards Butterflies N A, p 47, pl 15, figs 1-9

One female taken at "Halfway R between Brady's Ranch and Pink Mtn, alt 2600 ft, July 19" The specimen is in perfect condition

This varietal name is considered synonymous with typical *eurytheme* Bdv by Barnes and Benjamin[9] The Henry specimen is not, however, like typical *eurytheme* on the under surface The hind wings beneath are uniformly yellow-green, thickly irrorated with black scales and entirely lacking all spots, save stigma in disc and one, barely visible between M and Cu, The forewings, on under surface, are normal pale orange in ground color, but are irrorated at base, along costa, in cell, at apex, and broadly along outer margin to tornus with black scales, giving the whole under surface a boreal appearance On the upper surface it is normal but slightly paler than more southern specimens of *eurytheme* Possibly this specimen does not represent *eurytheme* or any of its described varieties, but examination of additional material from the Upper Peace River District will settle that

Additional material studied includes from Manitoba 1 ♂, Beulah, Aug 4 From various localities in Texas, S California, Arizona, twelve specimens of both sexes One additional ♀, bearing no data, closely resembles the Henry specimens

Blackmore (1927) does not mention *keewaydin* from British Columbia

Colias eurytheme amphidusa alba Strecker

1876 *Colias eurytheme* ab b *alba* Strecker, Cat p 83

One female "Pink Mt Base, alt 2850 ft, July 20" Another female "Near Pink Mtn and Halfway R, July 21"

The July 20 specimen is slightly rubbed, the other is entirely fresh and perfect Determination is based on Comstock's figure with which the specimens closely agree[10] They differ from *philodice* Godart, albino ♀, in the under surface of hind wings being, in Henry specimens, green-yellow heavily irrorated with black scales, and not pale, unsuffused white or cream color as in *philodice* They differ from *eurytheme pallida* Cockerell in having much narrower black margins on upper side of forewings and in having those of hindwings much reduced and not encompassing white submarginal spots as in typical *pallida* from California, New Mexico, Colorado, Nevada,

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[9] Barnes, W and F Benjamin, List of Diurnal Lep Bull So Cal Acad Sci XXV, part 1, p 8, 1926

[10] Comstock, J A, Butterflies of California, 1927, pl 14, fig 3

Washington, etc , of which there are thirty specimens before me The under surface of the Henry specimens differs from that of *pallida* in the same respect as it differs from that of *philodice*, these surfaces agreeing in *eurytheme* and *philodice* more closely with each other than with the British Columbia insects

I have seen no determined specimens of Strecker's *alba*, but of *amphidusa* I have studied a large series, all the females of which are the normal orange form From British Columbia 1 ♂, N Westminster, 1900, (Poling) From Manitoba 1 ♂, Beulah, July 26, 2 ♂, Miniota, June 29, 1919, (H Gibbon) And 32 specimens of both sexes ranging from Mississippi to Illinois and west to California with many from Utah, Nevada, Colorado, New Mexico, Arizona, and Texas

Although Blackmore (1927) does not include *alba* in his British Columbia list, he does mention *amphidusa* from a wide range there

The validity of this determination is open to question Possibly these insects will prove to be variant albinos of *philodice*, and not *eurytheme*

Colias christina Edwards   Plate 15, figs 3 and 4

1863 *Colias christina* Edwards Proc Ent Soc Phila , II, p 79

One male, one female (albino) "Pink Mt Base, alt 2850 ft , July 20 " One male "Halfway R below Cypress Creek, lat 2500 ft , July 18 " One male "Halfway R 12 mi W Pink Mtn , alt 3000 ft , July 21 " One female (normal yellow without black borders, small, exp 1 65 inches) "Halfway R between Brady's Ranch and Pink Mtn , alt 2600 ft , July 19 "

All specimens are fresh and in perfect condition and although slightly smaller than average, are typical of *christina* with the exception of the white female This white female resembles that sex of *scudderi* Reakirt on the under surface, but above is like other white females of *christina* It may be compared with *scudderi* as follows under side of forewings pure white on discal area, sharply contrasting with yellow-green, black-irrorated surface of hindwings It thus agrees with the under surface of all female *scudderi* I have seen, but contrasts with the more uniformly clouded and, therefore, less contrasted under surfaces of both wings in *christina* Upper side forewings with distinct, but incomplete black outer margins typical of *christina*, but present in no females of *scudderi* I have seen In all other points of maculation it agrees with normal *christina*

The shape of the forewing suggests *eurytheme* Boisduval, but the wing shape appears to vary throughout the genus and seems, therefore, to be of little definite taxonomic importance In no other respects does this specimen resemble *eurytheme*, however, since it lacks all the spots, save stigma, on under side, characteristic of that species Nor is the marginal maculation above as clearly defined as that of *eurytheme*, while the ground color of under surface of hindwings, and margins (outer and costal) of forewings is typical of *christina* and not at all of *eurytheme*

This is a puzzling example of one of the "intermediates" mentioned in the foreword, and seems to fall between the two species *scudderi* and *christina* It appears to represent a variant of one of these species in the direction of the other, and I have lumped it for the present with *christina* which is a common butterfly known from many localities in British Columbia and with which it was flying when captured On the other hand *scudderi*, so far as I know, is not found, over a wide range at least, in the Province. Moreover, *christina* is an extremely variable insect and this specimen possibly represents a "variety" common in the region where it was taken and from which little material has ever been seen

It is worth noting Edwards' observations concerning this species made several years after he first described it "*Christina*, since the opening of the Canadian Pacific railroad, has been taken by thousands on the plains of Manitoba and Alberta, and varies more than any other American Colias in both sexes I could fill three of my plates with distinct variations "[11]

As noted above, the other specimens of *christina* in the Henry series are all slightly smaller than those of Edwards' description or additional material before me Edwards' measurements cited in original description agree approximately with those of additional specimens They are ♂, 2 1″, ♀, 2 5″ The Henry specimens measure ♂, 1 70–1 75″, and ♀ (yellow), 1 65″, ♀ (white), 1 80″

Other specimens of *christina* studied include the following from Manitoba. 5♂, 5♀, Beulah, June 7, (1902)—Aug 4 From Alberta 1♂, June 24–30, 1♀, July 16–23, "Calgary", 1♀, Banff, 4♂, 7♀, "Alberta N W T" From N.W. Terr 1♂, 7♀, 1883, (Geddes) From Montana 2♂, 2♀ From Assiniboia 1♂, "Fort Qu'Appelle" Without data 1♀

Blackmore (1927) includes *christina* in his list for British Columbia

SATYRIDAE

Cercyonis oetus Boisduval

1869 *Satyrus oetus* Boisduval, Ann Soc Ent Belg, XII, p 63

One male from "Fork of Graham and Halfway R, alt 2300 ft, July 17"

Fresh and in perfect condition, the single specimen is slightly darker brown than many more southern examples with which it was compared As a result there is a tendency toward obliteration of the dark markings on under side of secondaries by the darkened ground color The ocelli on forewings above are both present but much obscured and not delineated with a pale ring as in some specimens studied from further south Miss Henry's specimen is, however, plainly an example of *oetus* and agrees entirely with other specimens of this species in all points of arrangement and position of the markings

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[11] Edwards, W H, Butterflies of N America, Third Series, p. 413, Supplementary notes 1897

Additional material studied includes 74 specimens of *oetus* of both sexes representing localities in Utah, New Mexico, California, Montana, Colorado, Oregon, and Wyoming

Blackmore (1927) includes *oetus* from British Columbia

Oeneis taygete Geyer Plate 16, fig 12

1824 *Oeneis taygete* Geyer, in Hubner's Samm exot Schmett, III, pl 450

One male from "Basins" N Besa R.W Redfern Lake, alt 6000 ft., Aug 1

The specimen is in perfect condition, apparently recently emerged at time of capture Agrees with comparative material

Compared with specimens from the following localities Alaska 2 ♂, 2 ♀, Bethel, June 3, 1897 From Labrador 1 ♂ With no data 1 ♂, 1 ♀

Blackmore (1927) lists *taygete* from British Columbia

Erebia disa mancinus Hewitson Plate 16, fig 13

1851 *Erebia mancinus* Hewitson in Doubleday & Westwood, Gen Diurn Lep, (2) pl 64, f 12

One male from "Caribou Pass, alt 5200 ft July 26"

Considerably rubbed and battered, the specimen had apparently been on the wing some time before capture It is by no means typical of *mancinus* since there are only two (coalesced) apical ocelli on forewing above, and was, therefore, considered at first to represent *rossii* Curtis But in all other respects it agrees better with *mancinus* than with *rossii*, and may be compared with that species as follows hindwing beneath with maculation all but obliterated by the uniform dark brown ground color The normal light band covering the outer third of wing in *disa* is just visible in the Henry specimen and bears a faint suggestion only of the "disa line", or zigzag dark line running from costa to inner angle and roughly dividing the light band into two equal parts [12]

In *rossii*, while the pale antemarginal band is present, it is more distinct (contrasts more sharply with remaining dark portion of wing), and the "disa line" in this case forms a series of arches or large crescents around the margin of the wing by coalescing with the black scaled vein tips which can be seen crossing the light ante-marginal band In Miss Henry's specimen, though it is considerably rubbed in this area, there seems to be no indication that the "disa line" originally formed these arches with the black vein streaks

Secondly, the Henry specimen is somewhat larger than typical *rossii* and measures approximately 47 mm (apex of left forewing lost).

Rossii is confined, according to Warren, to the northern coast of the Northeast Territories and the Franklin Islands and has been taken typically at 67°–68° N Lat. on the arctic coast.[13] It appears to be therefore, a far more northern insect in habitat than is *disa mancinus* which occurs in the mountains of Alaska and British Columbia.[14]

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[12] For further explanation of this line see Warren, Ent. Rec, 43, p 169, 1931

It is, of course, entirely possible that the whole of the range of *rossii* is not known, but seems probable that Warren would have mentioned the fact had he found proof in the material at his disposal, that this species occurred as far south as N British Columbia (approx 57° N Lat)

With regard to the loss of ocelli on forewings above, the following note from Warren's monograph is of interest "I have a specimen of *disa*, in which the only markings on the otherwise entirely black upperside are two minute apical spots on the forewings Such a specimen is difficult to distinguish from *rossii*, especially if at all worn Fortunately it is only an extremely rare aberration "[15] This description agrees entirely with Miss Henry's specimen except that the ocelli are not minute but of normal size They are, moreover, not nearly separated as in most *rossii*, but are larger and appear rather as one black spot surrounded by a pale brown ring constricted at the middle, the lower lobe larger than the upper

In addition to the above, the reason for considering Miss Henry's specimen *mancinus* instead of typical *disa* or *rossii*, aside from its locality, is the fact that the "red suffusion" of the forewing, considered typical of *mancinus* by Warren is distinctly present though impaired by rubbing[16] It is most noticeable on the under surface, the upper being largely deep brown to black, red coloring only faintly indicated

It is quite obvious that this single specimen is another case of apparent intermediacy The genitalia, however, have not been closely studied. Should a series of specimens from Caribou Pass all exhibit but two ocelli on forewing, taxonomic recognition of a new race of *disa* would seem in order, providing genitalic structure indicates relationship to this species

In addition to our own figures of Miss Henry's specimen, other published figures may be used for comparison[17] With fig 17, the Henry specimen differs as follows lower two ocelli on forewing absent, disk of forewing with more mahogany red suffusion Hindwing without two white marks. With fig 21 the Henry specimen differs in being slightly larger, termen of forewings more rounded, ocelli larger and not separated with pale ring. In ground color it is identical The ocelli are not pupilled white

Comparative material includes the following specimens of *mancinus* from Alberta. 1 ♂, Banff, June 16, '06, ("S" Brown), 1 ♂, Banff, June 23,

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[13] Warren, B C S, Monograph of the Genus Erebia, London, 1936, p 160, *rossii rossii*

[14] *Ibid*, p 172, *disa mancinus*

[15] *Ibid*, p 158, *E rossii*

[16] *Ibid*, p 172

[17] Holland (1931), pl 61, fig 17, *disa mancinus* (underside), fig. 21, *rossii kuskoquima* (upper side)

'08, 1 ♂, Alberta, N W.T From N W Canada 1 ♂ Of typical *disa* I have seen from Alaska 2 ♂, Bethel, June 3, '97 Specimens of *rossii* include from Alaska 4 ♂, 1 ♀, Bethel, June 2–3, 1 ♂, St Michaels, "*disa*".

Blackmore (1927) records *mancinus* from British Columbia. He does not mention *rossii*

Erebia epipsodea Butler

1868 *Erebia epipsodea* Butler, Cat Satyr Brit Mus, p 80

Three males from "Near Two Bit Creek and Halfway R, alt 2800 ft, July 21"

One specimen is perfect and fresh, the other two are rubbed and slightly battered All are quite typical

Compared with the following from Manitoba 7 ♂, 4 ♀, Miniota, June 3–10, 1919–21, (H Gibbon), 1 ♂, Beulah, June 16 From Alberta 2 ♂, Banff, 1 ♂, Lake Maligon (?), July 18, (Mrs C Schaffer) From Montana, Colorado, Wyoming, New Mexico, N W Territory (Geddes), and Kansas (1 ♂, Snow), 28 ♂ ♀

The species has a wide range in British Columbia according to Blackmore (1927)

NYMPHALIDAE

Argynnis[18] **atlantis** Edwards

1862 *Argynnis atlantis* Edwards, Proc Acad Nat Sci Phila, 1862, p 54

One female was collected "Between Graham R and Cypress Creek, Halfway R, alt 2400 ft, July 17"

It is battered, but little rubbed, and typical in all respects

In addition there are before me, closely agreeing with the above, the following from British Columbia 4 ♀, Osoyoos, (Dr J Fletcher), 1 ♂, Carbonate Draw, July 10, '08 From Alberta 2 ♂, 2 ♀, Lake Louise, July 21, and Aug 3, 1905, 1 ♂, 1 ♀, Banff, both bearing hand-written labels "Argynnis electa", 1 ♂, Calgary, head of Pine Creek, July 20, '01, (F H Wolley-Dod), and with another label "near electa" From Alaska 1 ♀, Circle, Aug.

This species has also been recorded from British Columbia by Blackmore (1927) and I have seen specimens from localities in the eastern and western limits of its range and can see no constant differences among them

Argynnis bischoffi washingtonia Barnes and McDunnough Plate 15, fig 5.

1913 *Argynnis bischoffi washingtonia* B and McD, Cont Nat Hist Lep N Am, Vol II, No 3, p 95, pl I, figs 5-8

One male "Pink Mt Base, alt 2850 ft, July 20"

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[18] Not *Dryas* Hbn — a "Tentamen" name See also Ann Carn Mus, XX, p 30, 1930

It is in perfect condition, freshly emerged Does not agree exactly with original description or figures, nor with specimens contained in the collection In the strict sense, typical *bischoffi* Edwards, cannot be considered a silvered insect,[19] and I agree with Barnes and McDunnough that since it is thus described, the silvered examples cannot be considered typical[20]

Representatives before me of *washingtonia* from Alaska, and Mt Ranier, Washington (see detailed data below) agree very closely in all respects with each other, and with figures and original description The Henry specimen differs from these in the following respects· more infuscated, with markings on upper surface more obscured at base, wing expanse larger than all males—nearer that of *eurynome* Edwards from Colorado (*washingtonia* 42–44 mm, Henry specimen 48 mm), in shape of forewing, longer, narrower, costa longer in proportion to inner margin than in *washingtonia*, outer margin more nearly straight, not as rounded as in *washingtonia* It agrees more closely with Edward's description of *bischoffi* (*cf* footnote 19) than with Barnes and McDunnough's description of *washingtonia* (*cf* footnote 20) save for the silvered spots, upon which Barnes and McDunnough largely base their distinction It agrees best with Holland's description of *bischoffi* in his Butterfly Book, where he also says that he regards the silvered and unsilvered specimens as both representing typical *bischoffi*[21] If this is proved to be the case in nature, then the Henry specimen will probably prove to be an example of *bischoffi* and not *washingtonia* with which it has only the silvered spots in common The type locality for *washingtonia* is Mt Ranier, Washington, 7000 ft, July, (*cf* footnote 20), of *bischoffi*, "Aliaska opposite Kodiak", (*cf* footnote 19), but specimens of *washingtonia* from Skagway, Alaska, agree well with Mt Ranier examples Possibly *washingtonia* is a valid subspecies which is primarily coastal in its distribution, typical *bischoffi* ranging further inland as it comes southward I have seen no determined material of *bischoffi*, however, and do not know whether such material would bear out the above proposition

In addition to the figures mentioned in Barnes and McDunnough's Contributions, the reader is referred to Holland's figures in his "Butterfly Book"[22]

From the above, it is plain that the determination of this butterfly is possibly incorrect, and that in reality it may represent none of the names mentioned Placed with the series of *washingtonia* it does not look identical with the majority of specimens and appears to be an extreme example of infuscation, with a series of *eurynome* and its varieties it is even more contrasting More material from this locality should clear up the confusion which now exists, especially that concerning the entirely different wing shape, a factor which seems to be fairly constant in both *eurynome* and *washingtonia* and all other species of the *eurynome* group, and does not in any examples I have seen quite reach the extreme represented by Miss Henry's specimen On the other hand I am fully aware that individual variation is very prevalent in this plastic genus, and, lacking more material from the Upper Peace River District have therefore placed this specimen under the above heading believing it to be most nearly correct

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[19] *Cf* Edwards, *A bischoffi*, Trans Amer Ent Soc, 3, pp 189-190, (1870)

[20] Cont Nat Hist Lep N Am Vol 2, No 3, pp 94 *et seq*, 1913, *bischoffi* and *washingtonia*

[21] Holland (1931), p 102

[22] *Ibid* Plates 11, fig 7, *bischoffi* similar, but lighter than Henry specimen and 56, fig 7 *washingtonia*, underside, quite similar but disc of forewing not so red as in figure

Additional material studied includes the following from Alaska 4 ♂, 6 ♀, Skagway, June, 1924, (1), July 1923, (2), 1924, (2), (W H Shoemaker), and other undated material From Washington 2 ♂, Stevens Ridge, Mt Ranier National Park, Aug 6, 1919, 6000 ft, (C L Fox), Paradise Valley, Mt Rainier, of which one is labelled additionally Aug 1923, (F W Schmoe), another July 29, 1919, 5500 ft, (C L Fox), and the third July 24–31 This last also bears a label which reads "*Washingtonia* B and McD comp with Type Coll Barnes practically exact" All specimens bear determination labels of Henry Skinner, save the one compared with type

Washingtonia has been recorded from British Columbia by Blackmore (1927)

In the series of *eurynome* in the Academy collection, those from Colorado were particularly studied since it is typically a Colorado species [28]

Brenthis chariclea (Schneider)

1794 *Papilio chariclea* Schneider Neu Mag V, p 588

Two males "Pink Mtn Base, alt 2850 ft, July 20" One ♂ "Trimble Lake Pass, alt 5000 ft, July 29" One ♂ "Red Bug Slough, alt. 4000 ft, Aug 6"

Originally perfect, now three specimens are damaged due to accident The two specimens from "Pink Mtn Base" are slightly darker, and the ground color redder, than those from higher altitudes, otherwise the specimens all resemble one another They range in wing expanse from 36 mm (Aug 6) to 38 mm (July 20) The black borders of fore and hind wings of Pink Mountain specimens are slightly heavier than in the other two

The Henry material has been compared with the following specimens now before me from British Columbia 1 ♂, 1 ♀, Hector, July 28, '06, (S Brown), 1 ♀, Field, (Brace) From Alberta 2 ♀, Lake Louise, Aug 3, 1905; 1 ♂, Banff From Alaska 8 ♂, Circle All det Skinner

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[28] Edwards, *A eurynome*, Trans Ent Soc Phila, IV, p 66, (1872-3)

Blackmore (1927) also records it from a wide range in British Columbia.

Brenthis pales var alaskensis Holland

1900 *Brenthis pales* var *alaskensis* Holland, Ent News, XI, p 383

One male, one female "Basins N Besa R W Redfern Lake, alt 6000 ft., Aug 1"

The male is slightly rubbed, but unbroken The female is rubbed and one wing is deeply nicked The male agrees perfectly with original description, the female with a female from Skagway, Alaska, in the Academy collection They appear to be typical in all respects, and agree closely with Holland's figures of the type male and female[24] The type male is apparently a little smaller than the Henry specimen, the female is more infuscated beyond the cell near costa of hind wing in the plate than in the female under consideration, but otherwise identical

Additional specimens studied include the following from Alaska 6 ♂, 2 ♀, Skagway, July 1924, (W H Shoemaker), 2 ♂, 1 ♀, Skagway, 5000 ft, (W H Shoemaker), and 1 ♂, Skagway, (W H Shoemaker) All det. Skinner

Blackmore (1927) does not mention the species or variety from British Columbia

Brenthis frigga improba (Butler) Plate 15, fig 6

1877 *Argynnis improba* Butler, Ent Month Mag, XIII, p 206

One female "Basins N Besa R W Redfern Lake, alt 6000 ft, Aug 1"

The specimen is slightly rubbed, both hind wings a little nicked. The specimen agrees well with the original description, and, on the upper surface, perfectly with Holland's plate[25] Although the figured example came from Baffinland, as explained on the plate, its agreement with the Henry specimen is almost photographically identical, with one exception — the B-shaped mark at end of cell in forewing, mentioned in original description, is better developed in the British Columbia specimen than in Holland's figure

I have seen no other specimens of *improba* nor any specimens of American *frigga*, but believe the Henry specimen to represent *improba* on the strength of the above

There is one matter which should be mentioned, however Holland figures the under surface of a ♂ *improba*[26] If this can be considered typical, then either that surface of the female is different, or Holland's figure is inaccurate Butler's description of the under surface of the hind wings of his type female, while agreeing with Miss Henry's example, does not agree with Holland's figure The specimen from British Columbia differs from Holland's figure as follows forewing similar, black maculation a little heavier Basal two-thirds of hind wing chocolate brown, outer third paler, pinkish fawn A broad, distinct band of spots, duplicating in shape and position those of upper surface runs across discal area of wing entirely within the dark basal two-thirds[27] Beyond that part of the band represented on the upper surface the band continues to the middle of the inner margin It is sharply angled at lower end of cell, where a wedge-shaped spot, longer than the others, makes the angle sharply pointed The band is pale yellow-brown in all but the costal and wedge-shaped spots, which are white as in the costal spot of the figure In other respects the figure and specimen are similar

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[24] Holland (1931), pl 55, figs 24–25

[25] Holland (1931), pl 49, fig 23 *B improba*

[26] *Ibid*, pl 60, fig 12

Blackmore (1927) mentions *improba* from Atlin, B C Possibly Miss Henry's record is one of the most southern yet recorded for this insect

Melitaea[28] anicia Hewitson Plate 16, fig 7

1848 *Melitaea anicia* Hewitson *in* Doubleday and Westwood, Gen Diurn Lep, pl 23, f 2

1862 *Melitaea anicia* Edwards, Proc Ent Soc Phila, I, p 223

One male "Basins N Besa R W Redfern Lake, alt 6000 ft, Aug 1"

The original description consists of the water-color figure cited above, which has been compared favorably with the specimen under consideration Mr Edwards gives a full description at the place cited above which seems to indicate a redder insect than either the original figure or Miss Henry's specimen

I am not at all satisfied that a correct determination has been made with regard to this single *Melitaea* It is darker than typical *anicia* from the Rocky Mountains of Alberta, and yet there appears to be no other species with which it so nearly agrees In distribution of spots it entirely agrees with *anicia* from Alberta, the red spots all reduced with resulting greater dominance of black ground-color Those spots which in normal *anicia* are pale yellow, are almost pure white in the Henry specimen Holland's figure of *anicia*, with which Alberta specimens agree, will serve as a basis for the above comparison[29] In addition the pale spot at outer end of cell in forewing is broader than that in figure and pure white The hind wing is very black, the red spots reduced to points before outer row of white spots which are likewise greatly obscured and reduced by encroachment of black ground color In blackness it approaches in appearance the hind wing of Holland's figure of *perdiccas* Edwards[30]

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[27] See Holland (1931), pl 59, fig 23

[28] Not *Euphydryas* Scudd I follow Holland, Ann Carnegie Mus, Vol 20, p 44, 1930

[29] Holland (1931), pl 57, fig 10

[30] *Ibid*, fig 2

On the under surface the Henry specimen agrees with Alberta material, and with Gunder's blurred photograph of *anicia*, ♀, save that the submarginal row of white spots in the hind wing are reduced and more broadly contiguous laterally than in the figure [31]

The butterfly is not aberrant in appearance, having all markings clear and sharply delineated, but grounds for nomenclatorial description are at present insufficient for two reasons first, lack of additional material from the Upper Peace River District, and, secondly, the possibility that Miss Henry's specimen merely represents an extreme individual, since individual variation in this genus is very prevalent In the series of Alberta specimens studied, there are individuals grading from the red condition, even more so than in Holland's figure referred to above, to a black condition nearly as pronounced as that of Miss Henry's specimen In addition to the above, the antennae of the Henry specimen are black-clubbed, a few red scales on the stalk and its segments minutely ringed with white, the rest black Edward's description calls for "dull-red" club and stalk, and this agrees with Alberta specimens before me.

Detailed data of the previously mentioned specimens of *anicia* follows from British Columbia 1 ♂, Osoyoos From Alberta 4 ♂, 1 ♀, Alberta, N W T, 1 ♂, Banff, July 1906, (B P Clark), 1 ♂, Laggan

Mr Clark's specimen, if *anicia*, is the only entirely red-spotted example of this species studied, and its antennae alone agree with those of Miss Henry's specimen

Blackmore (1927) records *anicia* from British Columbia

Phyciodes tharos pascoensis Wright

1905 *Phyciodes pascoensis* Wright, Butterflies of the West Coast of the United States by W G Wright, 1905, p 165, pl 21, figs 198, a

Two males "Pink Mtn. Base, alt 2850 ft, July 20" One female, no data

The specimens are all battered and somewhat rubbed, the female is least damaged The males agree with Wright's figures cited above The female, not figured by Wright, resembles the males above, is slightly larger and the black markings, of forewing especially, heavier. On the under side of hindwing the female is darker, with characteristic fine lines and dark shadings of typical *tharos* better developed than in the males Forewing beneath similar to males, black spots proportionately slightly larger

Wright, in his description of *pascoensis*, relates it to eastern *nycteis* Doubleday and Hewitson This is an incorrect assumption possibly based on a mistaken conception of true *nycteis* as evidenced by the illustration he gives to represent this species, but which actually is of *tharos* [32]

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[31] Gunder, J D The genus *Euphydryas* Scud of Boreal America (Lepidoptera, Nymphalidae), Pan Pac Ent, Vol 6, No 1, pl 5, *anicia*

[32] Wright Butterflies West Coast (1905), pl 21, fig 197

Other specimens studied include none from British America They are fresh and perfect examples and differ only from the British Columbia material in size (slightly larger on average) and brilliance of ground color doubtless due to their better condition The upper surface of the forewing in a few examples is more completely marked with black, as in typical *tharos*, than in Wright's figure or the Henry specimens, but the hindwings remain typical of *pascoensis*

This material includes the following examples from New Mexico 7 ♂, Jemez Springs, June 2–24, '13, (John Woodgate) From Arizona 1 ♂, no data From Utah 1 ♂, So Utah, July 1900, (Poling). From Idaho 1 ♂, N W Idaho, July 1900, (Poling), and an additional ♂ with no data, the largest example I have seen and possibly misdetermined, exp 40 mm

Blackmore (1927) mentions *pascoensis*, but not typical *tharos* from British Columbia

Phyciodes campestris (Behr) Plate 16, fig 8

1863 *Melitaea campestris* Behr, Proc Cal Acad Nat Sci, III, p 86

One female "Pink Mtn Base, alt 2850 ft, July 20", and one ♀ "Near Pink Mtn and Halfway R, July 21"

Both specimens are battered and rubbed One, however, is better than the other, and it is this specimen (July 20) which will be chiefly referred to in the following

If these insects represent *campestris*, they are by no means identical with what is commonly supposed to represent the typical form I have a few fresh females labelled as of this species from Alaska which are reasonably close to the British Columbia specimens, and it is on the strength of this Alaska material that I have been led to make a tentative determination of Miss Henry's butterflies until more material from the Peace River can be studied If such material proves identical to that now in hand, the erection of a new and distinct race of this species would seem in order, but until better and more material supports this supposition I shall leave it unnamed

In order to make clear the points of difference the reader is referred to Wright's figure of *pratensis* Behr,[33] which is now considered by recent authors as synonymous with *campestris*[34] The July 20 specimen is compared to figures here, except when otherwise noted

Miss Henry's specimen differs from Wright's fig 201b (♀) on upper surface of forewing as follows ground color of wing below cell from base to post median line of spots, black Ground color of cell brown as in figure. Post-median line of spots pure white as indicated in figure 201 (♂), which, however, is still too yellow. Longitudinal spot at end of cell pure white Transverse posterior line of spots (immediately following the post median row and separated from it with narrow black strip) entirely fused to form a continuous band of the brown ground color, not a series of lunules as in figure A series of pale, ill-defined dots inclosed in the band in spaces between veins from costa to inner margin Black area between band and subterminal series of crescents nearly obliterated by widening of band toward outer margin Hind wing (upper surface)· similar to figure, but basal area suffused with heavier black entirely obscuring marks Median band slightly narrower and more sharply angled inward at lower end of cell, the spaces between veins from end of cell to posterior end of band irrorated and suffused with white (In the July 21 specimen the entire band from angle to inner margin obscured with black)

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[33] Wright Butterflies West Coast (1905), pl 21, figs 201 (♂), a (♀) b (♀)

[34] Holland (1931), p 137, Barnes and Benjamin (1926), p 14, Blackmore (1927), p 9, etc

On the under surface the July 20 specimen agrees with figure 201c, but lacks black marks near apex of forewing and before largest crescents of outer margin The transverse posterior series of spots, the longitudinal spot at end of cell and spot immediately below it on inner margin more distinct, nearly white The hindwing agrees entirely with the figure (Those of July 21 specimens too rubbed to be recognizable)

In general the prevalence of brown ground color the well-defined jet black basal areas of both wings, the brown t p band of forewing, and white spots, of the upper surface of the Henry specimens are the differences which are outstanding when compared with figures or specimens of *campestris*, and are evident at a glance But in pattern arrangement, general size and shape, the Henry specimens agree entirely with the typical I have seen no ♀ which is as uniformly brown as Wright's figure (201b) most specimens being colored more nearly as his figure of the male (201)

Specimens of *campestris* from the Academy collection used for comparison include the following from Alaska 1 ♂, 7 ♀, Circle, August, 6 ♀, Circle, no date All but one (without date) from collections of R C Williams Jr

The species is "generally distributed" in British Columbia according to Blackmore (1927), but I have seen no determined material from there

Polygonia satyrus (Edwards)

1869 *Grapta satyrus* Wm H Edwards, Trans Amer Ent Soc, II, p 374

One male "20 mile summit, alt 4000 ft, Aug 15"

The specimen is not battered but somewhat rubbed on right forewing It is not typical in all respects The following comparison with Holland's figure will illustrate points of difference.[23] It should be added that female specimens of *satyrus* before me agree with original description but do not agree with Holland's figures, and that males do not differ materially from description or figures Possibly both illustrations represent males

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[23] Holland (1931), pl 20, figs 1 (♀), 2 (♀), under side

Upper surface similar to figure, but darker Brown ground color less brilliant Basal fifth of forewings obscured, nearly black, not darker brown as in figure Black infuscation at base of hindwings extends to the black spots in disc, rendering them less conspicuous and practically undefined on their basal margins The pale yellow-brown spots near outer margin in hindwing more conspicuous than in figure, placed in median line of a fuscous band which covers outer third of wing The color of this band the same as that in figure running along outer edge of pale spots A narrow band of ground color between black spots on disc and outer dark band

Under surface less evenly marked with green in lighter portions Dark bands and marks much darker, nearly black, standing out sharply from pale brown ground color The green color largely confined to apex and inner margin just before outer angle on forewing, at apex and on outer margin between longest marginal tooth and hind angle on hindwing, only the faintest suggestion of green washing elsewhere on wings

In pattern arrangement the butterfly agrees closely on both surfaces with the figures In size and shape of wings it is identical The differences noted are ones of degree, not kind, and the specimen therefore does not represent, in all probability, a valid taxonomic entity unless all *satyrus* from this region differ from the "typical" in the same manner as described above

Possibly figure 2, referred to in footnote 35, shows too much green washing, for other specimens studied resemble the Henry specimen in having this color more locally confined

Particularly compared material includes from British Columbia 1 ♂, 1 ♀, Victoria, Aug 4, '95, from Vancouver, 1 ♂, 1 ♀, Corfield In addition, a long series of both sexes, representing localities from N Mex to Washington, has been studied, and with which the Canadian specimens just noted entirely agree

Blackmore (1927) includes *satyrus* from British Columbia

Polygonia faunus rusticus (Edwards)

1874 *Grapta rusticus* Edwards, Trans Amer Ent Soc, V, p 107

One male labelled "Pink Mtn. Base, alt 2850 ft, July 20"

It is a fresh and handsome specimen The green markings on under surface are prominent It is typical in all respects and differs very little from eastern *f faunus* Edwards It agrees entirely with Holland's figure of Edward's type save that the ground color is a shade darker toward base of wings[36]

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[36] Holland (1931), pl 59, fig 26

Other *rusticus* studied are from California 1 ♀, Kaweah, (Hopping). From Manitoba 1 ♂, Island Lake, (E. T Blundell). Both of these specimens show the characteristic green markings of under side, but less prominent and more confined in area In addition long series of *faunus* from the eastern United States representing both sexes were compared with Miss Henry's specimen and differs from it only in having the ground color of outer two-thirds of upper surface of forewings slightly darker

Blackmore (1927) lists *rusticus* from British Columbia

Polygonia gracilis (Grote and Robinson)

1867 *Grapta gracilis* Grote and Robinson, Ann Lyc New York, VIII, p 432

One male from· "Aylard (20 mile) summit, 1932"

The specimen is fresh, unrubbed and unbroken Agrees completely with all examples examined except that black spots of upper surface are larger than those of several examples, but not of a few others and intergrades between the extremes are represented

Additional material examined includes specimens from Alaska 22 ♂, ♀, Circle From Ontario 1 ♂, Fort William, July 15–Aug 15, (C S Williamson) A few others from New Hampshire and Maine

Blackmore (1927) does not mention *gracilis*

Aglais[87] **antiopa** (Linnaeus)

1758 *Papilio antiopa* Linnaeus, Syst Nat, ed 10, p 476

One male, two females "Custs House, alt 1600 ft, Aug 17"

All are a little rubbed, wings unbroken They are typical in all respects not varying from specimens collected in New Jersey, California, or Alaska The male is smaller than the females They have been compared with specimens from the United States (East and West Coast), and Alaska

Blackmore (1927) records the species as "generally distributed" in British Columbia

Basilarchia arthemis rubrofasciata Barnes and McDunnough

1916 *Basilarchia arthemis rubrofasciata* B and McD, Can Ent, 48, p 221

Three males from "Pink Mtn. Base, alt 2850 ft, July 20" One female from "Halfway and Graham R Junction, alt 2200 ft, 1932"

Males are fresh and perfect Female is slightly battered and quite rubbed, larger than males Agree with original description entirely and with additional material

Additional material studied includes the following from Manitoba 12 ♂, 2 ♀, Miniota, June 12–29, 1919, (Hugh Gibbon), Island Lake· 1 ♂, (E T Blaundell)

Blackmore (1927) records *rubrofasciata*, but not typical *arthemis*, from British Columbia

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[87] See Holland (1931), p 151 Also Ann Carn Mus, XX, p 46, 1930 and references cited in that paper

LYCAENIDAE

Chrysophanus mariposa (Reakirt)

1866 *Polyommatus mariposa* Reakirt, Proc Ent Soc Phila, VI, pp 149–150 (footnote)

One male from "Caribou Pass, alt 5200 ft, 1932"

It is slightly rubbed, one wing minutely nicked, but on the whole a fresh specimen Agrees well with comparative material and original description, although rubbing and partial irroration of gray scales on under surface of secondaries obliterate, to some extent, the spots of the submarginal and second bands mentioned in the description The marks are all present, however In addition to the description the Henry male and other males in comparative series all show a purple reflection on upper surface of both wings

The Academy collections contain one paratype of *mariposa* labelled, in handwriting, as follows "mariposa Reak Type, California" It is apparently a male, but abdomen is missing, wings nicked and faded to a paler brown, the purple reflections very faintly evident It agrees, however, quite well with the original description

Comparison of Miss Henry's specimen has been made with the following examples beside the paratype referred to above From British Columbia 1 ♂, 1 ♀, no further data From Alberta 2 ♂, 1 ♀, "Alberta, N W T", 1 ♀, Laggan From Oregon 1 ♂, 2 ♀, Ft Klamath, July 17, '95 (one ♀ no date), 1 ♂, No 146, R C Williams Jr Coll From California 1 ♂, Yosemite, 1 ♂, Descanso, San Diego Co, 3400 ft, Sept 13, 1922, (Rehn and Hebard) From Montana 1 ♂, 1 ♀, "Upper Geyser Basin, July 31, '95 From Utah 1 ♀, Park City, July 5, 1895, (A J Snyder)

Blackmore (1927) records *mariposa* from British Columbia

Chrysophanus snowi henryae, new race Plate 16, fig 9

Female Upper surface closely resembling typical *snowi* Edw, but with all black spots, save the two in cell of forewing, much reduced, those of hindwing becoming mere points Ground color of forewing bright, metallic orange with coppery reflections, somewhat brighter than Colorado specimens Hindwing of the same color irrorated through basal and discal areas with black scales, base nearly black Border of wings black, notched outward at vein tips, the notches of orange ground color Fringes dull white Spot arrangement exactly as in the typical Colorado specimens of *snowi*

Under surface of forewings with ground color orange, paler than that of upper surface and with no metallic reflections, but much brighter than Colorado specimens Veins, outer margin to submarginal row of spots, apex, costa, base and inner margin all pale ash gray, all black spots narrowly bordered dirty white Hindwing ground color exactly that of gray parts of forewing irrorated over basal third from costa to anal angle with black scales The contrast in color between fore and hind wing sharp

Spots placed as in typical *snowi*, but minute, appearing as tiny specks rather than well developed spots The submarginal series small, but well developed in the typical, are nearly obliterated, only a few black scales indicating their location, and the spots at apex entirely absent The normal brick-red spots near anal angle reduced to a few scales

Antennae black, broadly ringed with white at the base of each segment Club black, last segment brown Palpi with first segment black above; second and third black above irrorated with white, white on sides and below, third segment tipped white From base to tip, palpi below fringed with long hairs mixed black and white Thorax below black, a few white scales, and sparsely clothed with white hairs Legs femora and tibiae white, femora with white fringe of hair below Tarsi black, the segments broadly edged white above Abdomen white below Head, thorax, and abdomen black above clothed with fine gray-black hair

Expanse—28 mm (approx left primary nicked at apex)

Type Female "Caribou Pass, alt 5200 ft, July 26" [A N S P, No 7779]

It is evident from the above description that the single specimen here described represents an extreme offshoot from *snowi*, but should not be considered specifically distinct It is doubtful whether a taxonomic entity should be based on a single specimen, but the reason for so doing in this instance is based on the fact that the spots on under surface of wings, in all specimens of *snowi* examined, and also the closely related *cupreus* Edw, while varying in size to some extent, in no case approach the minuteness of those of *henryae* Moreover, the sharpness of contrast in ground-color between under surface of forewing and hindwing is not duplicated in either sex of all *snowi* studied At first glance typical specimens of *snowi*, on under side especially, look almost specifically distinct from *henryae* but minute comparison shows the latter to be an extreme variant of the former In color contrast of fore and hind wings beneath, *henryae* resembles *cupreus* Edw, but almost entirely lacks the subterminal series of orange spots on under side of secondaries, well developed in all *cupreus*, and which make up one of the chief characters by which *cupreus* and typical *snowi* are separated [38]

For further comparison see Holland's figures of *snowi* [39] The ground color of *henryae* above more nearly approaches that of male (fig 7) than of female The series of *snowi* before me agrees well with these figures

In brief, *henryae* is a female specimen resembling a male *snowi* above (ground color identical, not as bright or red as in *cupreus*), and below distinct but more like either sex of *cupreus* than of *snowi* with respect to the contrast of ground color of fore and hind wings

Specimens of *snowi* examined include the following From Alberta 2 ♂, Laggan. From Colorado 1 ♂, 3 ♀, Bullion Peak, July 25, 2 ♂, 1 ♀,

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[38] See Edwards Trans Kans Acad Sci, vol 7, pp 69-70, 1879-80, *snowi*.

[39] Holland (1931), pl 27, figs 7 (♂), 8 (♀)

Hayden Peak, 14,200 ft, Aug., 1 ♂, Hall Valley, July 16, '02, 5 ♂, 5 ♀, "Col", from R C Williams Jr Collection, 3 ♂, 2 ♀, (D. Bruce) Of *cupreus* I have seen the following from Oregon. 6 ♂, 4 ♀, Fort Klamath From California 1 ♂, 1 ♀, Mono Lake, Mono Co, June 15, 1917, (C L Fox), 1 ♂, 1 ♀, Lundy, July 9, 1904, (Wickham), 3 ♂, Donner Lake, July 4–12, 1916, Dodge, one specimen, 3 ♂, Yosemite

Blackmore (1927) includes *cupreus* but not *snowi* from British Columbia—possibly a misdetermination

The race is named for its discoverer, Miss Josephine de N Henry

Lycaena[40] **amyntula** Boisduval

1852 *Lycaena amyntula* Boisduval, Ann Soc Ent France, X, series 2, p 294

One female bearing the following label only "Upper Peace R Dist N Br Col, 1932, J de N Henry"

It is a rubbed specimen with hindwings both slightly nicked at hind angles, the tails are preserved Most of the blue reflection is lost, due to rubbing On under side of secondaries the marginal orange, blue-pencilled spot is absent and replaced by a single black spot Other black spots on this surface are nearly obliterated

From a large series of additional specimens, three females were selected for special comparison and agree in all respects save the better preserved black spotting, and typical orange marginal spot, near tail, on under side of hindwings These specimens are from Oregon 1 ♀, Ft Klamath, June 17, 1895, Washington 2 ♀, Olympia, May All from collections of H Skinner

Blackmore (1927) records *amyntula* from British Columbia

Lycaena scudderii kodiak Edwards Plate 16, figs 10 (♂) 11 (♀)

1870 *Lycaena kodiak* Edwards Trans Amer Ent Soc, III p 20

Four specimens from the following localities 2 ♂, "Halfway R 10 mi west Westergard's Cabin, alt 3500 ft, July 22 One ♂, 1 ♀, "Pink Mtn Base, alt 2850 ft, (♂), 4500 ft, (♀), July 20"

Males are all fresh and not battered The female has right primary nicked at apex and is somewhat rubbed The submarginal crescents on the under side of secondaries of the two males from "Halfway R " agree with those of Alaskan specimens before me save that in the Henry specimens the orange color is slightly less clouded with gray ground color In all but this respect they are in agreement with Holland's figure of underside male *kodiak*[41]

The male and female from "Pink Mtn Base " are intermediate in appearance between *kodiak* and typical *scudderii* On the under surface the ground color is purer gray, less clouded with darker scales, the submarginal crescents larger, with orange color unobscured and identical with that of *scudderii*[42] but still not as large as in typical *scudderii* and maintaining the characteristic shape of these spots in *kodiak*. Of this pair the female is most like *scudderii*, the male only suggesting that sex of the typical, with paler and clearer ground color, larger more distinct black spots and more orange in the submarginal crescents, of secondaries beneath, than in that surface of typical *kodiak*

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[40] I follow Holland's usage of this generic name See Holland (1931), p 255

[41] Holland (1931), pl 66, fig 15

On the upper surface the specimens agree with Alaska material, but are lighter and more purple than in Holland's figures[43]

Additional material examined includes specimens of *kodiak* from Alaska 6 ♂, 5 ♀, Circle, Aug, (4 ♂, 1 ♀ and with no date, 2 ♂, 4 ♀) Specimens of *scudderi* from New York 7 ♂, 4 ♀, Karner, May 21–July 16, 1903–8, 1 ♂, Albany, May 16, 1903

In addition to those, 12 other specimens of both sexes and labelled "form *scudderii*" from various localities in northwestern United States and British America are in the Academy's collection Some are true *scudderii*, others near *kodiak*, and still others intermediate

Blackmore (1927) mentions *scudderii* but not *kodiak* from British Columbia

Lycaena saepiolus Boisduval

1852 *Lycaena saepiolus* Boisduval, Ann Soc Ent France, series 2, X, p 296

Two specimens from the following localities one male, "Halfway R below Cypress Creek, alt 2500 ft, July 18" One female "Halfway R 10 mi west of Westergard's Cabin, alt 3500 ft, July 22"

The male is quite fresh, little rubbed and not battered The female is quite rubbed and right secondary is nicked at margin The male is typical of *saepiolus* in all respects, the female, in so far as condition of specimen will permit, appears to be also

From a large series of specimens from localities in Canada, California, Oregon, Utah, and Colorado the following were selected as agreeing most closely with the Henry specimens From Ontario 3 ♂, 3 ♀, Nepigon, July 8, 1907 From Vancouver 5 ♂, 1 ♀, Corfield, May 9–31, 1895 From Manitoba 1 ♂, 1 ♀, Miniota, June 12, 1921, (Hugh Gibbon) From Northwest Territory 1 ♂, 1883, (G Geddes) All of these specimens agree with Miss Henry's specimens in having the black spots on under side of wings somewhat smaller than those of Colorado, California and other more southern examples

Blackmore (1927) records the species for British Columbia

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[42] *Ibid*, fig 12, *scudderii*, type underside

[43] *Ibid*, figs 13-15, *kodiak*

EXPLANATION OF PLATES 15 AND 16

Each figure represents both surfaces of the same insect, the upper side in the left column, and underside in the right All figures are slightly under natural size

Plate 15

Fig 1—*Colias eurytheme keewaydin* Edw ♀ "Halfway R between Brady's Ranch and Pink Mtn"

Fig 2—*Colias hecla glacialis* McLachlan ♀ "Basins N Besa R W Redfern Lake"

Fig 3—*Colias christina* Edw ♀ (albino) "Pink Mtn Base"

Fig 4—*Colias christina* Edw ♀ "Halfway R between Brady's Ranch and Pink Mt"

Fig 5—*Argynnis bischoffii washingtonia* B & McD ♂ "Pink Mtn Base"

Fig 6—*Brenthis frigga improba* Butler ♀ "Basins N Besa R W Redfern Lake"

Plate 16

Fig 7—*Melitaea anicia* Hewitson ♂ "Basins N Besa R W Redfern Lake"

Fig 8—*Phyciodes campestris* Behr ♀ "Pink Mtn Base"

Fig 9—*Chrysophanus snowi henryae,* new race (type ♀) "Caribou Pass"

Fig 10—*Lycaena scudderii kodiak* Edw ♂ "Halfway R 10 mi W of Westergard's Cabin"

Fig 11—*Lycaena scudderii kodiak* Edw ♀ "Pink Mtn, alt 4500 ft"

Fig 12—*Oeneis taygete* Geyer ♂ "Basins N Besa R W Redfern Lake"

Fig 13—*Erebia disa mancinus* Hewitson ♂ "Caribou Pass"

THE SNAKE GENUS ENULIUS COPE

BY EMMETT REID DUNN

The collection of this Academy contains the type specimen of *Liophis flavitorques* Cope 1869, from the Magdalena River, Colombia, a species which has not been reported since its original description It also houses two specimens which are assuredly part of the original "several" on which Cope, in 1871, based his new genus *Enulius*, and his new species *murinus* This form has been reported once since, from Mexico, by Bocourt in 1883, but this report was, according to Cope in 1884, erroneous Upon examining *L flavitorques* and *E murinus* I was surprised to find them conspecific, and further to be identical with the tolerably well-known snake which Gunther described from South America in 1872 as *Leptocalamus torquatus*

In connection with this complete change in nomenclature I have gathered a few data on this form and on another species of the genus and present them here

Enulius flavitorques (Cope)

1869 *Liophis flavitorques* Cope, Proc Acad Nat Sci Philadelphia 20, p 307 (Magdalena River, Columbia Type A N S P 3695)

1871 *Enulius murinus* Cope, Proc Amer Phil Soc 11, p 559 and Rep Peabody Acad Salem 2-3, p 80 (statements identical and exact dates uncertain Chinandega, Nicaragua Collected by McNeil Types "several were from a well 40 feet deep" "Peabody Acad 546" Two are now A N S P 3314-5 the whereabouts of the others not known)

1872 *Leptocalamus torquatus* Gunther, Ann Mag Nat Hist (4), 9, p 17 (South America I have examined the type in the British Museum)

1881 *Geophis unicolor* Fischer, Abh Nat Bremen p 227, pl 15, f 1-3 (Mexico I have not seen the type, which is Bremen 434)

1883 *Enulius sumichrasti* Bocourt, Miss Sci Mex, Rept, p 538, pl 31, f 6 (Tehuantepec, Mexico Type in Paris, not seen)

1883 *Enulius murinus* Bocourt, l c, p 537, pl 35, f 9 (Mexico, two)

1884 *Geagras longicaudatus* Cope, Amer Nat p 162 (substitute name for *Enulius murinus* Bocourt)

Material I have examined 74 specimens of this species, as follows

GUATEMALA Coffee Zone (Field Mus 22913), Escuintla (U S N M 12694, five) Boulenger (1896, Cat Snakes Brit Mus (2), 3, p 641) records one without specific locality

HONDURAS San Pedro Sula (Field Mus 5280–3); Subirana Valley, Yoro (Field Mus 21848)

NICARAGUA Chinandega (A N S P 3314–5); Lake Nicaragua (Brit Mus.). Andersson (1916, Medd Goteborg Mus 9, p 31) records one from "G Granada"

COSTA RICA· Miravalles (M C Z 15264), Barranca (Mus Nac Costa Rica); Cartago (two, Coll St Luis Gonzaga), no locality (Mus Nac Costa Rica, Seminario de San Jose)

PANAMÁ Chiriqui (Berlin), Pedro Gonzales I (M C Z.), Ancon 14 (M C Z); Balboa 7 (M C Z, A M N H), Bruja Pt (M.C Z), Flamenco I (M.C.Z), Ft Amador (M.C Z), Albrook Field (M C Z), La Boca (M C Z), Sabanas 4 (M C Z), Fort Clayton 4 (M C Z); Pedro Miguel 4 (M.C.Z), Summit (Lindsay), Frijoles (Carnegie), Barro Colorado I (M C.Z), Cristobal (A N S P.), Ft Davis (M.C Z), Ft Sherman 2 (M C Z), Canal Zone (M C Z), Panamá 4 (M C Z, U.S N M, Collegio La Salle) Peracca (1896, Boll Mus Torino 11, 253) has recorded it from Punta Sabana, Darien.

COLOMBIA. Magdalena River (A N S P 3695)

SOUTH AMERICA No locality (Brit Mus)

Characteristics · The dorsal scales are smooth with one apical pit They number 17 in all specimens seen or recorded except· the G Granada specimen reported by Andersson which had 15, the specimen from Barranca, C R, which had 15 in some areas and 17 in others, in specimens I have counted myself the ventral scales range from 180 to 209 Peracca reports 176 from Darien, Bocourt 177 from Mexico, and Cope 216 from Nicaragua The lower counts are males and the higher females, but the sexes overlap between 184 and 190 The caudal scales range in specimens I have counted from 88 in a female to 109 in a male Sexual overlapping occurs between 100 and 105 A count of 85 has been recorded by Boulenger for a female from Lake Nicaragua

Preoculars are absent in most specimens, but A N S P 3695 has one on each side, excluding the loreal from the orbit, A N S.P 20825 from Cristobal, C Z, has a preocular on the left side, excluding the loreal from the orbit, the type of *sumichrasti* is figured as having a preocular on each side, above the loreal, which it does not exclude from the orbit

Postoculars 2 Temporals 1–2 Upper labials 7, third and fourth in orbit Lower labials 7, four (rarely three) in contact with the single pair of genials

Black or blackish brown above, lighter on the sides, belly light The first, and usually the second, scale rows are the same color as the belly

Head usually dark, a light collar from middle of the parietals to second or third dorsal scale, dorsum of body dark A N S P 20825 (Cristobal, C Z) has the entire head light except for the region around the eyes and nostrils U S N M 12694d (Escuintla, Guat) has the collar broken into three light spots Field Mus 22913 (Guatemala) has the lower half of the upper labial light, the nasals light, and the collar reduced to a light spot on each side just back of the seventh labial This variation is reported by Cope for a cotype of *murinus* from Chinandega, Nicaragua One from the Panamá Sabanas has no light markings, and neither have A N S P. 3314 (Chinandega), U S N M. 12694e (Escuintla), nor any of the four reported from Mexico

The variations in scalation or coloration have no geographical arrangement which seems to me significant

The four specimens reported from Mexico are, in my opinion, members of this species. I have not seen them, but the descriptions of Bocourt and of Fischer, which are reasonably detailed, do not mention a single character which would serve to differentiate them from the specimens I have seen.

Enulius slateri (Boulenger)

1894 *Leptocalamus slateri* Boulenger, Cat Snakes Brit Mus (2), 2, p 251, pl 12, f 1 (" ? South America ", type examined in Brit Mus)

Material I have examined 14 specimens of this species, as follows

Nicaragua Matagalpa (M C Z 17079), no locality (U S N M 15206).
Costa Rica Peralta (M C Z 28079–80), Guasimo (Brit Mus), Finca Hamburg (Hamburg 5326)
Panamá Atlantic side Canal Zone (M C Z 34382), Barro Colorado I (Carnegie 7683, Field 22852), Yavisa (four, E R D)
? South America (Brit Mus)

Characteristics The dorsal scales are smooth with two apical pits They number 15 in all specimens The ventral scales range from 132 to 151 The caudals are 97–98 No preocular, postoculars 2, temporals 1–2, upper labials 7, third and fourth in eye, lower labials 7, three in contact with the single pair of genials

Dark brown or black above, light below The head in eleven specimens is light from three scales back of the parietals forward, except for the immediate vicinity of the eye and the snout The Matagalpa specimen, the Atlantic side of Canal Zone specimen, and one of the Yavisa specimens have the front of the head dark as far as the anterior edge of the parietals, and a light collar to two scales back of the parietals

The two species may be readily distinguished as follows

A Dorsals with one pit, 17, ventrals 176–216, usually a light collar *flavitorques*
AA Dorsals with two pits, 15, ventrals 132–151, head usually white *slateri*

The genus *Enulius* is characterized as follows Small, cylindrical snakes, with head scarcely distinct from body, tail long, eye with round pupil; scales smooth with one or two apical pits, anal double, subcaudals double, scales in 15 or 17 rows, no posterior hypapophyses, maxillary dentition of 3–4 small teeth increasing posteriorly, followed immediately by one or two relatively enormous flattened (ungrooved) fangs, hemipenis slightly bifurcate, sulcus forked at extreme distal end, no calyces, organ with minute uniform spines, usually no preocular, loreal usually entering eye, two nasals, coloration of body uniform; usually a light neck collar or whole head whitish, belly light

No American snake is known with a similar hemipenis or similar dentition None of the other small American ground snakes has such a long tail or has any scale pits. The systematic position of *Enulius* is thus remarkably isolated. We must search for its relatives among much larger and less depauperate forms.

The snake described by Amaral (1935, Mem. Inst. Butantan 9, p. 219, f. 1, 3, 5, from La Pedrera, Colombia) as *Leptocalamus limitaneus* is, to judge from the description, not congeneric with *flavitorques* and *slateri*. It has no scale pits, the anal is single, the tail is short (30 subcaudals in a male), the body is striped. In these characters it disagrees with *flavitorques* and *slateri*, but does not differ from the various species of *Atractus*, where I would suggest it belongs.

CASTILLEJA IN THE CHARLESTON MOUNTAINS, NEVADA

BY FRANCIS W PENNELL

The Charleston Mountains, located in western Clark County in southernmost Nevada, rise from the sage-brush lowland to alpine heights, Charleston Peak reaching 11910 feet (3633 meters) above sea-level The rock is largely limestone, and the mountain heights receive considerable winter snow The conditions are such as to lead one to expect very considerable endemism

Lying off the older routes of travel the Charleston Mountains have been little visited The late Dr F V Coville was there in 1891, but too early in the season to make many collections Mr A A Heller, who has visited so many portions of North America, was there in 1913, his widely distributed specimens indicated various species as new to science, but these were unfortunately left unpublished[1] The first comprehensive attempt to collect the flora of the Charlestons was made by Dr Edmund C Jaeger, who in 1926 published " A Preliminary Report on the Flora of the Charleston Mountains of Nevada ",[2] a brief study which characterized no species as new to science, although there were notes about a few plants that might prove to be so Within the past few seasons Mr Ira W Clokey has undertaken the adequate exploration of these mountains, gathering material of first quality in ample sets,[3] and planning a full study of the flora I am indebted to him for the remarkable series of specimens on which is based the following account of the Indian Paint-Brushes there

All the species of *Castilleja* on the Charleston Mountains have bracts and calyces distally red or scarlet-red, and the lower lip of the corolla deep green and very short relative to the long greenish-yellow galea The three species differ as follows

A Sepals united little, if at all, farther posteriorly than anteriorly the calyx symmetrical, corolla 20–30 (–40) mm long, some or all of the leaf-blades lobed, stem 2–6 dm tall
  B Corolla 25–30 (–40) mm long, twice exceeding the calyx, both the galea and the lip being exserted, capsule narrowly conical, 5–7 mm wide, often nearly thrice as long as wide, mid-portion of leaf-blade lanceolate or oblong-lanceolate, herbage through-

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[1] Thus in the Scrophulariaceae he had proposed names for what were later described as *Synthyris ranunculina* Pennell (1933) and *Penstemon keckii* Clokey (1937)

[2] Occasional Papers of Riverside Junior College, vol 1, No 1, pp 1-5, 1926 This gives a brief introduction, from which I have taken the above descriptive and historical information

[3] Plants to be distributed in the series of " Exsiccatae Grayanae " from Harvard University

out with short gland-tipped hairs and also with longer glandless ones mostly in the inflorescence . . . 1 *C clokeyi*

BB Corolla 18–25 mm. long, the galea slightly exceeding the calyx but the lower lip wholly concealed within it; capsule cylindric-ovoid, (5–) 7–8 mm wide, about twice as long as wide, mid-portion of leaf-blade linear or nearly so, herbage pubescent with fine short hairs and also villose-hirsute with longer hairs, all hairs white and glandless . 2 *C chromosa*

AA Sepals united much farther posteriorly than anteriorly, the calyx distally wholly on the upper side of the flower, corolla 35–45 mm long; leaf-blades entire or occasionally slightly lobed, linear or nearly so, stem 4–8 dm tall 3 *C linariaefolia*

1 **Castilleja clokeyi** Pennell, sp nov

Forming large clumps, the stems many from the stout perennial main root Stem 2–6 dm tall, simple or with some ascending branches, somewhat angulate, pubescent with short spreading gland-tipped hairs and also, mainly distally, with longer white hairs, hirsute-villose in the inflorescence Leaf-blades lanceolate or oblong-lanceolate, the lower or only the lowermost entire, the main stem-leaves becoming 3–5 cm long and usually with 1 or 2 pairs of ascending-spreading or divaricate lobes, those of the branches much smaller and often entire, the blades glandular-pubescent and more or less clearly 3-ribbed Inflorescence becoming 10–25 cm long, the upper flowers crowded and exceeding the bracts, the lower becoming scattered and equalled or exceeded by the bracts Bracts shorter than the leaves, with 1 or 2 pairs of slender lobes, glandular-pubescent, and also villose proximally on the ribs and margins Pedicels in anthesis very short, in fruit becoming 2–3 mm long Calyx becoming 17–20 mm long, the component sepals united medianly nearly ⅔ length (equally on both posterior and anterior sides) and laterally ½ to ⅔ the remaining length so that the free lateral lobes are triangular-lanceolate, 2–4 5 mm long, calyx proximally hirsute-villose and pale, distally finely glandular-pubescent and green, the free lobes red Corolla 25–30 (–40) *mm* long, tube included within *the* calyx, galea 15–19 mm long, dorsally greenish-yellow and finely pubescent, laterally with thin red glabrous margins, anterior lip rudimentary, dark green, thickened, 1–1 5 mm long Anthers yellow, extruded from the apex of the galea Stigma clavate or slightly bilobed, 0 3–0 5 mm wide Capsule 15–17 mm long, 5–7 mm wide, conic, attenuate Seeds 1 5–1 7 mm long, with loose alveolate testa

(Perennis; caules multi 2–6 dm alti pilis glanduliferis brevibus et nudis longis obsiti, folia lanceolata vel oblongo-lanceolata infimis integris et superioribus 3–5 lobatis, calyx 17–20 mm longus sagittale aequaliter fissus lobis lateralibus rubris 2–4 5 mm longis, corolla 25–30 (–40) mm longa lobis exserta, galea 15–19 mm longa, labio anteriore brevissimo; capsula 15–17 mm longa attenuata, semina 1 5–1 7 mm longa)

Type, gravelly loam, on north slope with *Pinus scopulorum* (Engelm) Lemmon and *Populus aurea* Tidestrom, at an altitude of 2425 meters, Kyle Canyon, Charleston Mountains, collected in flower and commencing to fruit July 8, 1936 by I W and C B Clokey, no 7322, in Herb Academy of

Natural Sciences of Philadelphia, isotypes to be distributed in Exsiccatae Grayanae

Apparently restricted to the Charleston Mountains, from which the following additional collections have been seen Big Falls (gravelly soil, 2760 m), *Clokey & R Bean* 7320, in flower July 14, Charleston Peak (gravelly hillside and broken rock at timberline, 3270–3300 m), *Clokey* 5585 and 7708, in flower July 22 and August 8, Clark Canyon (gravelly wash, etc , in yellow pine belt, 2670 and 2760 m), *Clokey* 7318[4] and 7319, in flower June 1 and July 12, respectively, Kyle Canyon (gravelly loam, canyon bottom, etc , 2270, 2425 and 2700–3200 m), *Clokey* 5583, 7321 and 7322, in flower July 29, June 6, and July 8, respectively, and also *Goodman & Hitchcock* 6671, in flower and fruit July 22, Lee Canyon (limestone, 3000 m), *Heller* 11042 and 11070, in flower July 26 and August 5, respectively

From other Indian Paint-Brushes of the Great Basin area possessing herbage with glandular hairs, *Castilleja clokeyi* differs in several characters *C viscidula* Gray of the East Humboldt Mountains, Nevada and *C viscida* Rydb of the Wasatch Mountains of Utah have the galea shorter than the tube of the corolla, the former also bears smaller corollas and the latter narrower and usually longer calyx-lobes than *C clokeyi* *C applegatei* Fern and *C pinetorum* Fern , both of the Klamath valley in southern Oregon, have the galea sometimes equalling the corolla-tube, and so nearly as long proportionally as in *C clokeyi*, but the capsules are smaller and wider (10 × 5 mm) and the leaf-blades narrower, in *C pinetorum* being usually all entire Among all these species *C clokeyi* is most likely to be confused with *C viscida*, the aspect of the leaves and bracts being closely similar, but the galea of *clokeyi* is usually more conspicuously exserted

2 **Castilleja chromosa** Nelson

This is the dominant Indian Paint-Brush of sagebrush land over much of the Great Basin and Colorado valley On the Charleston Mountains the following collections have been seen Clark Canyon (wash, in juniper and yellow pine belts, 2120 m), *Clokey* 7317 and 7432, in flower June 1 and May 7, Cold Creek Spring[5] (brushy flat, 2000–2250 m), *Clokey* 7710 and 7711, in flower and fruit June 2, Harris Spring Road (brushy hillside, 1700 m), *Clokey* 7713, in flower May 17, Kyle Canyon (hillside and flat, in juniper belt, 1550 and 2100 m), *Clokey* 7315 and 7712, in flower May 11 and 28, Trout Creek Canyon (fan, in Covillea belt, 1500 m), *Clokey & E G Anderson* 7316, in flower May 8, and below Webber Wells (wash, in juniper belt, 2000 m), *Clokey & Anderson* 7314, in flower May 31

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[4] 7318a, growing with 7318, differs by possessing much larger flowers, and is the sole cause of extending the limits of corolla-size from 30 up to 40 mm long It is evidently a rare, and perhaps unique, large-flowered form of the species

[5] Leaves unusually wide and bracts "deep rose-pink "

Although readily recognized by its combination of villose-hirsute indumentum, divided foliage, brilliant scarlet-red bracts, and corollas largely hidden within the calyces, this species has had a checkered nomenclatural history In Gray's "Revision of the genus Castilleia", published in 1862,[6] it formed the largest component of the considerable aggregate drawn together under the name of *C parviflora* Bong , but that plant, which had been described in 1833 from the cool and humid coast of southeastern Alaska, differs greatly from our desert species, its lower lip being at least ⅓ the length of the galea of the corolla, its bracts being violet in color and the whole herbage drying blackish, its leaf-blades being wide with narrow divaricate lobes, and the plant below the inflorescence being essentially glabrous. In his "Notes upon some northwestern Castillejas of the Parviflora Group", published in 1898,[7] M L Fernald removed *C parviflora* from close association with the other components, calling the main constituent of the group, *C angustifolia* (Nutt) Don

Euchroma angustifolia Nutt had been described in 1834, based upon a plant collected by Capt. N J Wyeth in June, 1833 on the "Little Goddin River, head waters of Columbia", now known as the Little Lost River, a stream flowing from the mountains of eastern south-central Idaho southward to lose itself in the lava plain of the upper Snake River The type, still preserved at the Academy of Natural Sciences of Philadelphia, shows itself to be certainly of close kinship to the widespread Indian Paint-Brush of the Great Basin and Colorado valley, but this specimen alone is too fragmentary to prove actual identity Fortunately it has been possible to visit again the valley of the Little Lost River, and my own numbers 15191 and 15192 from gravelly or stony calcareous soil, 5 miles northeast of Howe, Butte County, close to the Little Lost River, and also my number 15211 from a sagebrush flat along Willow Creek, northeast of Dickey, Custer County, in the adjacent Lost River Mountains, are all the same species and evidently *Castilleja angustifolia* This proves to be a local plant of southeastern Idaho, remarkable for the purple coloration of the bracts, and also separable from the plant of the Great Basin territory by its narrower capsule and usually smaller corolla, of which the lower lip is longer relative to the galea (galea ca 4 × lower lip)[8] The plant from the "sagebrush plains of Shoshone and Twin Falls", along the Snake River south of the lava field, which was described in 1913 as *C bennittii* Nels & Macbr., becomes *C angustifolia* (Nutt) Don, while the wide-ranging plant of our interest must receive some other appellation

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[6] Amer Journ Sci Ser 2, 34 336

[7] Erythea 6 46

[8] *Euchroma bradburii* Nutt , described at the same time and from the same source as *E angustifolia*, is clearly no more than a wider-leaved form of that plant The leaves of the type, likewise preserved at the Philadelphia Academy, are well matched by specimens of my number 15211 This specific name has also been erroneously adopted for another species not present in the neighborhood of the Little Lost River, and it is clear that the plant of western Idaho which has been called *Castilleja bradburii* (Nutt) Don can no longer be known by this name.

Of other early names assigned by Gray and Fernald to this complex there remains *Castilleja douglasii* Benth But this Californian species, dating from 1846, shows as clear structural as it does geographic distinctness. Compared with our inland plant, *C douglasii* is a larger and much less hairy species, its wider leaf-blades bearing more ascending lobes, and its corollas being larger (25–30 mm long)

In passing it should be noted that *Castilleja desertorum* Geyer, usually cited to W J Hooker's report on Geyer's plants published in 1853,[9] appeared there only as a synonym, and seems to have been first described as a valid species in Rydberg's Rocky Mountain Flora of 1917

No further names pertaining to this desert group of Indian Paint-Brushes appeared until nearly the close of the century, when in 1899 *Castilleja chromosa* Nels [10] was proposed from southern Wyoming Although Dr Nelson expressed himself as " satisfied of the perfect distinctness of *C chromosa* " from Fernald's characterization of *C angustifolia* (Nutt) Don, he published no comparison of the two, and I think his plant identical with that chief element of Gray's and Fernald's treatments which we have now under consideration Accordingly I use the name *chromosa*, very apt for this brilliant plant, as the designation of the widespread species which is present on the lower elevations of the Charleston Mountains

3 Castilleja linariaefolia Bentham

This species, first described in 1846,[11] is a wide-ranging plant of middle elevations on the Rocky Mountains and on other mountain areas across the Colorado valley and Great Basin as far as southeastern California The inflorescence is villose and the base of the stem also hirsute with white hairs, the latter constituting an excellent point of recognition for this species In the prevalent and typical form the intervening portion of the stem is quite glabrous, and such plants occur on the Charleston Mountains But at scattered locations over most of the range of the species, Spanish Peaks of southeastern Colorado, Raft River Mountains of northwestern and Henry Mountains of southern Utah, near the Grand Canyon of northern Arizona, on mountains of northeastern and southeastern Nevada, and in southern California occurs a form in which the intervening portion of the stem is grayish-puberulent or -pubescent Because so erratic in occurrence, I am considering this as a form rather than a variety, calling it **omnipubescens**, *forma nova,* (Stem and leaves pubescent throughout—caulis omnino pubescens et folia pubescentia), and typifying it by Clokey 7327, now in Herb. Academy of Natural Sciences of Philadelphia This was gathered in flower and fruit July 29, 1936 on deep gravelly wash, alt 2670 meters, among *Pinus scopulorum* in the bed of Lee Canyon, Charleston Mts , Clark County, Nevada, the collectors being I W Clokey, C B Clokey and Russell Bean Forma *omnipubescens*, which proves to be the dominant representative of the species on the Charleston Mountains, is indicated on the following list by asterisk, while the species itself is denoted by the hyphen-sign

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[9] Journ Bot & Kew Misc 5 258 " Desert of upper Colorado, under *Artemisia cana* on clayey banks [Geyer] n 511 "

[10] Bull Torrey Bot Club 26 245 Of the three collections cited, all gotten by the describer in southern Wyoming in June, 1898, being his numbers 4577 from Leroy Uinta County, 4721 from Green River, Sweetwater County, and 5380 from Fort Steele, Carbon County. I arbitrarily select the first as type It was the first collected, being dated June 7 Type seen in Herb University of Wyoming, isotypes in Herb Academy of Natural Sciences of Philadelphia, and elsewhere

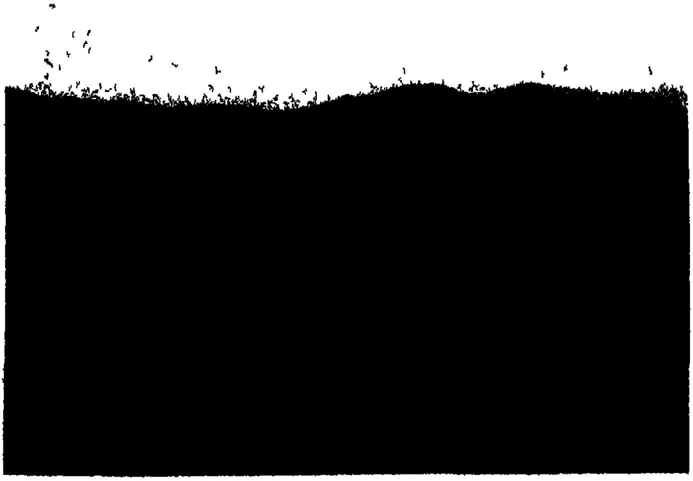
[11] Benth in DC, Prod 10 532 "In mont Scopulosis (Fremont!) (v s herb Torrey)" Type seen in Herb New York Botanical Garden According to Fremont's notes preserved also at the New York Botanical Garden, the type was collected August 26–31, 1842, along the north slope of the Laramie Mountains in the present Converse or Platte counties, Wyoming

Specimens seen from the Charleston Mountains are -Charleston Park (brushy bottom and north slope under pines, 2400 m), *Clokey* 5651 and 7714, in flower July 25 and 29, and *M E Jones*, in flower July 3, *Charleston Park (wash and slope with pines and aspens, 2250 m), *Clokey* 5652, in flower July 30, -Clark Canyon (wooded bottom, juniper and yellow pine belts, 2170 and 2425 m), *Clokey* 7323 and 7709, in flower July 4, *Clark Canyon (gravelly wash, yellow pine belt, 2425 m), *Clokey* 7325, in flower July 12, *Deer Creek (ridge, south of D C , among pines, 2650 m), *Clokey* 5584, in flower July 31, *Griffith Lodge (flats and slopes with pines and aspens, 2250 m), *Clokey* 5581, in flower July 30, *Kyle Canyon (deep gravelly wash, yellow pine belt, 2270 m), *Clokey & Bean* 7324, in flower July 2 and 7326, July 3, *Lee Canyon (flat and wash in canyon, 2450 and 2670 m), *Clokey* 5582 and 5658, in flower August 1, and *Heller* 11012, in flower July 28, -Little Falls (brushy hillside, 2450 m), *Clokey* 5577, in flower August 7.

TAXONOMY AND DISTRIBUTION OF ARAGOA, AND ITS BEARING ON THE GEOLOGICAL HISTORY OF THE NORTHERN ANDES

By Francis W Pennell

Among the strange plants of the bleak heights or "paramos" of the Colombian and Venezuelan Andes are the species of *Aragoa*, densely branched bushes with crowded rigid narrow or scale-like leaves that give the plants a conifer-like aspect Growing in a continuously chill climate a resistant habit that yet permits of growth during each day is a most favorable adaptation, and indeed the peculiar vegetative growth of *Aragoa* is approached by that of such associates as *Loricaria* of the Asteraceae and *Hypericum* of the Hypericaceae But these others are neither so tall nor so bushy as *Aragoa*



Aragoa cupressina on Cerro Guadalupe above Bogota, Columbia, where seen in 1917

When in blossom the dark green bushes of *Aragoa* are studded with small white flowers In structure these and the ensuing capsules show that the genus belongs to the tribe Veroniceae, of the Scrophulariaceae, although differing from its advanced members, *Hebe* and *Veronica*, by the stamens being four in number and the capsule dehiscing septicidally with secondary loculicidal dehiscence of each valve, a simple splitting of the woody capsule-wall into four pieces In *Hebe* and *Veronica* only the postero-lateral stamens remain, and in both genera the dehiscence of the capsule is more elaborate, in *Hebe* by a distal fissure of the median wall of each cell after the carpels have parted septicidally, in *Veronica* solely by loculicidal dehiscence The presence of four stamens, the simply dehiscing capsule, and the shrubby habit all lead to the supposition that *Aragoa* is a primitive member of its tribe It is the only genus of this alliance native to tropical America, so that its geographic fully matches its structural isolation It must have had a long past on the paramos of the Northern Andes

My first acquaintance with *Aragoa* was made near Bogotá in September, 1917. On the open summit of Mt Guadalupe, beside the church that is a landmark above the city, grows *A cupressina*, and presumably it was there that Humboldt and Bonpland gathered it on their visit to Bogotá in 1801 South from this hill in the moist valley of the Páramo de Cruz Verde, I found *A abietina*, and this again is doubtless where Humboldt and Bonpland obtained it Only once since have I gathered *Aragoa*, and that was in February, 1918 on the tiny Páramo de Chaquiro near the extreme northern end of the Western Andes of Colombia I had ascended by dugout the Sinu River and then its tributary, the Río Esmeralda, thence by foot up along the Rio Antizales, and from the mountain village of Antizales in Bolivar up the trail that crosses the Cordillera Occidentál southward to Uramá in the Atrato valley (the Chocó) Most of the crest of the cordillera was in the "paramillo" or shrub-zone, the actual grassland or "paramo" comprising only about five acres Fortunately it had a characteristic flora, and afforded at least some of the plants which must occur on the larger mountains of this almost unknown chain The most surprising find was the plant described below as *Aragoa occidentalis*

The distribution of the species of *Aragoa*, and especially the occurrence of *A occidentalis* so remote from the others, can only be explained as resulting from a considerable geologic past All species pertain strictly to paramo elevations, and are so specialized thereto as to leave no doubt that their peculiar characteristics result from common paramo ancestry Their rather large seeds seem unadapted for any method of distant transportation Consequently I think that their dispersal must have taken place over continuous or nearly continuous paramo routes Such areas still nearly or quite connect the three species of the Cordillera Oriental of Colombia, *A abietina* and *A cupressina* of Bogotá, and *A lycopodioides* of Ocaña, while it is easy to conceive a past when such a route existed over the present break of the Istmo de Táchira to the Sierra Nevada de Mérida of Venezuela where *A lucidula* grows But it is more difficult to visualise the past conditions under which contact ever existed between these eastern species and *A. occidentalis* at the most remote extremity of the Cordillera Occidentál. The problem is not only to make contact with that species, but to understand why so striking a genus appears to be absent from the Cordillera Central of Colombia, which is placed directly between the two other cordilleras

As to contact between the Eastern and Western Cordilleras, I think that there must have been a past when continuous cold highland existed through the length of both chains south to a common junction in southwestern Colombia Such connection is needed to explain the passage of a plant ecologically so restricted as *Aragoa* As to the present broken condition of the Western Cordillera its great erosion is the natural result of its receiving on its western side the heaviest rainfall in the Western Hemisphere We have now left us only the remnants of a great chain which has been largely washed away But why in its passing has not *Aragoa* colonized the Central Cordillera?

The suggested explanation is that *Aragoa* existed on these vanished heights at a time antedating the rise of the Central Cordillera The latter chain has evident marks of modernity its continuity is unbroken from Ecuador to central Colombia, its peaks are more numerous and so high as repeatedly to reach snow, and a considerable number of them are still actively volcanic (Not only are the other cordilleras both broken, but they have scarcely any peaks reaching snow and none which are volcanic) It would have been after a considerable breaking down of the southern connecting portions of the Eastern and Western Cordilleras, that the Central rose, either from a preexisting low range or presumably from the floor of the Magdalena valley The latter probability is suggested by the higher level of the Cauca valley and its past damming, just as if it once had been the mountain-foot portion of the Magdalena valley

There are so many genera peculiar to the northern Andes (from northernmost Peru to Venezuela) as to make necessary the assumption that some portions of the Cordilleras are of relatively great antiquity [1] In my travels in Colombia I was repeatedly impressed with the greater diversity and number of the species of Scrophulariaceae on the Eastern as compared with the Central Cordillera of Colombia, a situation that seemed equally applicable to other families of plants The flora of the Central Andes seems limited and modern, just as should be the case if it were of relatively recent origin

The accompanying map shows well the isolation of the present highlands of Colombia and Venezuela Its physiography is from two sources

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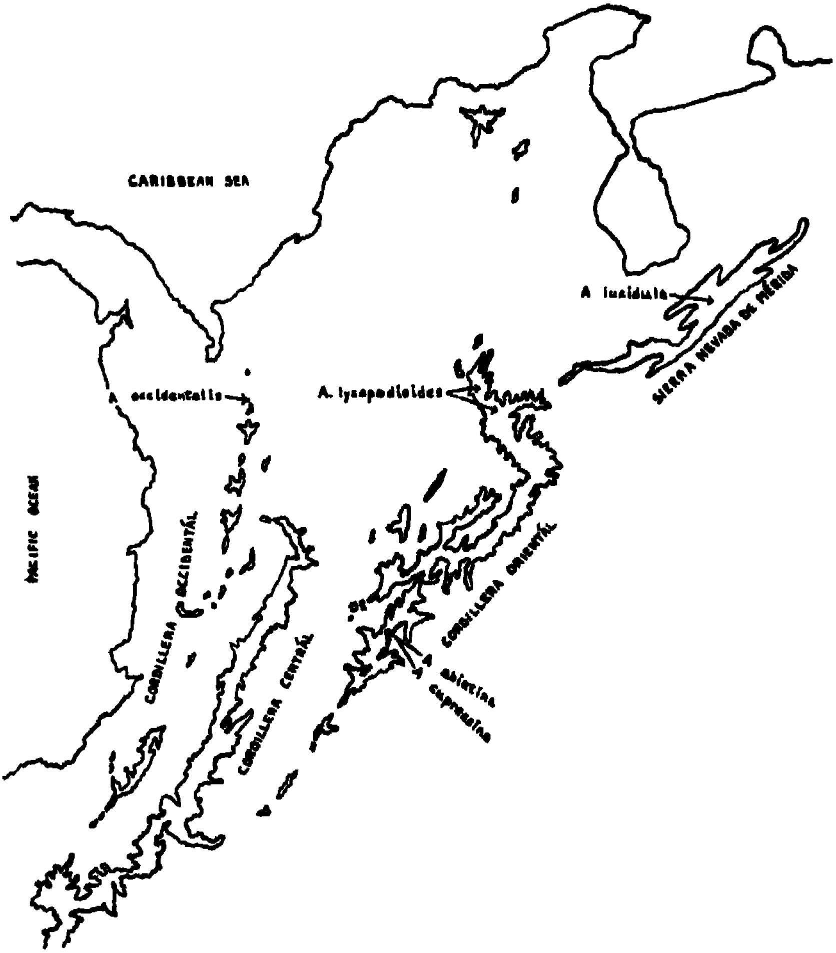
[1] In H Gerth's Geologie Südamerikas, Zweiter Teil, pl 30, 1935, the highland of the Eastern Cordillera of Colombia is shown as composed of Cretaceous formations, thus indicating an antiquity sufficiently remote for this hypothesis The highlands of the Western Cordillera are not so marked, but it seems likely that they are as little known to geologists as to botanists I think that their origin will prove to be at least as remote as early Cenozoic time, but, as volume 3 of Gerth's work, covering the Cenozoic period, has not yet been issued, the matter is not readily checked For this reference I am indebted to the kindness of my colleague, Dr B F Howell

For Colombia it has been drawn from the map of F. J Vergara y Velasco appearing in his Atlas Completo de Geografia Colombiana (Bogotá, 1906), a map that I suspect was actually based upon the thorough physiographic studies made by Codazzi between 1849 and his unfortunate death in 1855. In many parts of Colombia I have tested the marvelous accuracy of this



Cold highlands (Tierra Fria) of the mountains of Colombia and Venezuela, showing distribution of the species of *Aragoa*

Vergara map On it the highlands, labeled "Flora Extratropical y Tierras Frias y Gelidas", are shown in black, and it is the outlines of this zone which have been traced. For Venezuela I have tried to outline comparable highlands from the Atlas de Venezuela (1916) on which are marked merely the altitudes of certain places, the resulting portrayal can be only an approximation to the probable boundaries. The outlined highlands in both countries include cold forest (Chapman's Temperate Zone) as well as paramo, the latter formation being necessarily more broken than my portrayal shows. But in the inclusion of the cold forest there is this advantage. The map, as it stands, makes allowance for probable fluctuations of past temperatures; it is quite possible that at some time, and under approximately the present stage of erosion, paramo may have descended over much or most of the area outlined, but we can hardly conceive of its going lower into what is now subtropical forest.

ARAGOA Humboldt, Bonpland, & Kunth

Genotype, *A. cupressina* H. B. K., selected as the first of the two original species.

- Leaves linear-subulate, flattened and ridge-keeled beneath, black-punctate, spreading or loosely ascending; seeds 2–3 mm. long; stem glabrous, except when young.
  - Corolla glabrous within; seeds 2.5–3 mm. long; leaves dull, not or scarcely glutinous, 7–10 mm. long. 1. *A. occidentalis*
  - Corolla pubescent within tube and usually over bases of lobes; seeds smaller; leaves shining, glutinous.
    - Sepals 7 mm. long, acute, exceeding the slightly angled capsule; seeds 2 mm. long; corolla 12–14 mm. wide; leaves 5–7 mm. long; stem stout, 7–8 mm. thick; plant soon glabrous. 2. *A. abietina*
    - Sepals 3–4 mm. long, acutish or obtuse, shorter than the strongly angled capsule; seeds 2.5 mm. long; corolla 6–8 mm. wide; leaves 2–3 mm. long; stem slender, 3–6 mm. thick; stems, pedicels, and tips of sepals more persistently woolly. 3. *A. lycopodioides*
- Leaves thickened, not keeled or only so distally, not punctate, appressed; seeds 1–1.5 mm. long; stem permanently villose.
  - Corolla slightly pubescent at mouth of tube; seeds winged and flattened, the testa extended far beyond the body of the seed; sepals 2 mm. long, plane or slightly concave, pubescent on the back, shorter than the capsule; leaves spatulate-oblong, 1–2.5 mm. long, rounded and shining-glutinous, yet pubescent beneath. 4. *A. lucidula*
  - Corolla densely villose at mouth of tube; seeds scarcely winged or flattened, the testa little extended beyond the body of the seed; sepals 5 mm. long, deeply concave, glabrous on back, longer than the capsule; leaves triangular-subulate, 3–4 mm. long, keeled distally beneath, not glutinous, glabrous beneath. 5. *A. cupressina*

1. **Aragoa occidentalis** Pennell, sp. nov.

Shrub, about 1 meter tall. Stems distally much branched, the main stem 6–7 mm. thick, the branches ascending and crowded. Branchlets soon glabrous. Leaves crowded, spreading, about 16 rows around stem, 7–10 mm. long, narrowly linear, obtuse, thickened and slightly keeled beneath, glabrous except for a few hairs on upper surface near base. Sepals 4 mm.

long, concave, oblong-ovate, tipped with a callose obtuse tip. Corolla glabrous throughout, its tube 5 mm long, angled, yellowish-white, its lobes widely spreading, 6–7 mm long, each triangular-obovate, rounded at apex, white. Filaments white, glabrous Anthers grayish-white Capsule 5–6 mm long, glabrous, brown, with 4 ridges along which it splits both septicidally and loculicidally Seeds few, large, 2 5–3 mm. long, flattened, irregularly oval, each with a widely expanded loose finely reticulate whitish testa.

(Frutex, 1 m. altus, caulis conferte ramosissimus, folia conferta, patentia, 7–10 mm longa, anguste linearia, obtusa, subtus carinata et glabra; sepala 4 mm longa, concava, oblongo-ovata, mucrone callosa obtusa, corolla tot glabra, tuba 5 mm longa, angulata, flavida, lobis patentissimis, 6–7 mm longis, obovatis, rotundatis, albis, filamenta antheraeque glabra, capsula 5–6 mm. longa, septicida et loculicida, semina pauca, magna, 2 5–3 mm. longa, testis albidis late expansis instructa)

Type, grassy paramo, Paramo de Chaquiro, Cordillera Occidentál, Colombia, about 7° N latitude, altitude 3000 to 3200 meters, collected in flower and fruit February 23, 1918, by Francis W Pennell, no 4269, in Herb Academy of Natural Sciences of Philadelphia, isotype in Herb New York Botanical Garden

Dry grassy paramos, northernmost mountains of the Western Andes, seen only from the original collection, but evidently growing also on the much larger paramo, " Paramillo ", visible to the eastward from " El Chaquiro " There, on an ornithological visit in January, 1915, Leo E Miller and Howard Boyle saw " stunted pines " that in all probability were instead *Aragoa occidentalis*, in their view of " Characteristic Vegetation of the Paramillo " (Bull Amer Mus Nat Hist 36 pl 23 1917) this is presumably the dark, intricately branched, and densely foliose bush that is much in evidence Both on the Paramillo and El Chaquiro the paramo is underlain by a hard sandstone, and in January and February was parched although the cold forest just below was saturated with moisture

COLOMBIA. Antioquia-Bolivar border. Páramo de Chaquiro, Cordillera Occidentál, between the valleys of the Río Sucio (Atrato drainage) and the Rio Esmeraldas (Sinú drainage), Pennell 4269 (H, K, Ph, U, Y).

2 **Aragoa abietina** Humboldt, Bonpland, & Kunth

Aragoa abietina H B K, Nov Gen et Spec 3 156 t 217 1819 " Crescit cum praecedente [juxta Santa Fé de Bogotá] " This was almost certainly gathered on the Paramo de Cruz Verde above Bogotá, to which Humboldt and Bonpland climbed, there I collected it in 1917.

Moist paramos, on the southern portion of the great plateau of the Eastern Andes, in the department of Cundinamarca, Colombia Occurs on the mountains to either side of the Sabana de Bogotá: on the main Cordillera Oriental on the Páramo de Cruz Verde and Páramo de Choachi above Bogotá, and on the paramos near Guasca slightly to the northeast, on the mountains northwest of the Sabana on the Pâramo de la Pradera.

COLOMBIA Cundinamarca Paramo de Cruz Verde, Pennell 1905 (H, K, Ph, U, Y), Monserrate, H Garcia B 4809 (U), Páramo de Choachi, Killip & Ariste Joseph (Ph), " Paramo de Bogota ", Triana (U, Y), " In montibus ad orient Bogota, Holton 589 (H, K, Ph, Y), eastern paramos of Guasca toward Gacheta ", Bro Ariste-Joseph (U); Paramo de la Pradera, " western hills, Highlands of Bogota ", Lehmann 7562 (F, K)

3 **Aragoa lycopodioides** Bentham

Aragoa lycopodioides Benth , Oliver in Hooker's Icones Plantarum 14 18 t 1325 1880 "Hab New Granada, Purdie! Ocaña, Schlim! Kalbreyer!" Type, selected as being the specimen that was carefully studied and drawn by Oliver, is Kalbreyer 1029, collected at San Pedro, between Ocaña and Pamplona, Colombia, March 24, 1879, this seen in Herb Kew Gardens, London, England

Paramos, near the northern extremity of the great plateau of the eastern Andes, and on that cordillera northward toward Ocaña, in the departments of Santander and Norte de Santander, Colombia Recorded from altitudes of 3500 to 4200 meters

COLOMBIA Santander Paramo de las Coloradas, above La Baja, Killip & Smith 18391 (U), Paramo de las Puentes, above La Baja, Killip & Smith 18188 (Ph), 21173 (Ph), Paramo de Romeral, Killip & Smith 18572 (Ph) Norte de Santander Paramo de Santurban (between Tona and Mutiscua), Purdie[2] in 1825 (K), Killip & Smith 19582 (Ph), 19621 (Ph), San Pedro, Kalbreyer 1029 (K), "Prov de Ocaña ", Schlim 428 (K, U)

4 **Aragoa lucidula** Blake

Aragoa lucidula Blake, in Journ Washington Acad Sci 14 453 1924 " Venezuela Sierra Nevada de Santo Domingo, Merida, altitude 3600 meters, 12 Sept 1922, A Jahn 1091 (type no 1,186,693 U S Nat Herb)" Type seen in Herb United States National Museum

Paramos, Sierra Nevada de Mérida, Venezuela Known only from the original collection

VENEZUELA Mérida Sierra Nevada de Santo Domingo, Jahn 1091 (Ph,U)

5 **Aragoa cupressina** Humboldt, Bonpland, & Kunth

Aragoa cupressina H B K , Nov Gen et Spec Plant 156 t 216 1819 "Crescit juxta Santa Fe de Bogotá " This grows on Mt Guadalupe, just above Bogotá, whence it may well have been gathered by Humboldt and Bonpland, there I collected it in 1917

Dry paramos, or probably the lower bushy margin of paramos, on the southern portion of the great plateau of the eastern Andes, in the department of Cundinamarca, Colombia Known only from Usme to Guasca

COLOMBIA Cundinamarca, Mt Guadalupe, above Bogotá, Andre 1249 (Y), Pennell 1915 (H, K, Ph, U, Y), Monserrate, above Bogotá, Dawe 13

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[2] Another collection, made by Purdie in 1845 on the "Páramo de Cuchero", is in Herb Kew Gardens, I have not located this paramo Can it be Páramo de Cachiri or Cachira in Norte de Santander?

(U, Y), Paramo de Cruz Verde, above Bogotá, Triana 229 (K, U, Y); "In montibus juxta Bogotam", Holton 588 (H, K, Ph, Y), Páramo de Usme, Bro Ariste-Joseph (Ph, U), eastern paramos of Guasca, toward Gacheta, Bro. Ariste-Joseph (U).

GUIDE TO HERBARIA CONSULTED

F —Field Museum of Natural History, Chicago, Illinois
H —Gray Herbarium of Harvard University, Cambridge, Massachusetts.
K —Royal Botanic Gardens, Kew, England
Ph—Academy of Natural Sciences, Philadelphia, Pennsylvania
U —United States National Museum, Washington, D C
Y —New York Botanical Garden, New York City

ABSTRACTS OF MINUTES OF THE PROCEEDINGS OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

February 16, 1937

Annual Meeting of the Academy

Thirty-two members present

Vice-President, Dr Edwin G Conklin, in the Chair

Attention was called to the loss the Academy had suffered in the death, on January 22, 1937, of Mr Effingham B Morris, its President since 1928 The following tribute to Mr Morris was paid by Dr Conklin

I have been asked to say a few words of appreciation of Mr Effingham B Morris, late President of the Academy of Natural Sciences This is a function which others who were more intimately associated with him here could perform more acceptably than I can, and this applies especially to Mr Charles M B Cadwalader, Managing Director of the Academy, who was Mr Morris' *alter ego* But as Senior Vice-President of the Academy and as a close friend of Mr Morris I cannot decline to render my tribute of affection and esteem

The bare facts of Mr Morris' long life of more than 80 years constitute a record of distinguished services to the city and State in which he lived and they are impressive enough to rank him as one of our leading citizens For more than 40 years he was President of the Girard Trust Company and for the past nine years Chairman of its Board, he was a Director of the Pennsylvania Railroad Company, and during the World War was Treasurer of the Council of Defense and of the Committee of Public Safety of Pennsylvania His interest in and support of scientific and educational institutions of Philadelphia entitle him to a position of especial importance and peculiar honor He had been a member of the Board of Managers of the Wistar Institute since 1915 and President of the Board since 1922 He was a kinsman of General Isaac J Wistar, founder of the Institute, and was deeply interested in all of its work In response to a statement of the Director of the Institute, Dr Milton J Greenman, of the need of a Biological Farm for the expanding work of the Institute, Mr Morris, in 1928, gave to the Institute a farm of 150 acres of arable land and forest with numerous springs and pools, together with farmhouse and buildings, in Bucks County, Pennsylvania, 4½ miles from Bristol, 18 miles from Princeton and 34 miles from Philadelphia In the development of this farm as an ideal place for biological research he took the greatest interest, visiting it almost every week Appropriately it bears the name of "The Effingham B Morris Biological Farm of the Wistar Institute"

Mr Morris was elected a member of the Academy of Natural Sciences in 1896, the same year in which I became a member He served on the Finance Committee as member and chairman from 1905 until his death He was elected a member of the Board of Trustees when that body was first constituted in 1925, and finally he was elected President of the Academy, November 20, 1928. With characteristic modesty he accepted this position with some hesitancy and only after he had conferred with me and other officers and had secured the consent of Mr Charles M B Cadwalader to serve as Managing Director

As in every other position which he held, he took his duties as President seriously He regularly presided at all meetings of the Scientific Council and Mr Cadwalader, to whom I owe many of these details, says that he never failed to attend and preside at every meeting of the Academy and that in all his tenure of office he was never absent, even from Committee meetings, except occasionally when he was ill Such faithfulness in the discharge of his duties was one of his outstanding characteristics

In the last 55 years the Academy has had seven Presidents, namely, Dr Joseph Leidy, who served from 1882 until his death in 1891, General Isaac J Wistar from 1892 to 1896, Dr Samuel G Dixon from 1896 until his death in 1918, Mr John Cadwalader from 1918 to 1922, Dr R A F Penrose, Jr, from 1922 to 1926, Dr T Chalkley Palmer from 1926 to 1928, and Mr Effingham B Morris from 1928 until his death on January 22, 1937 During all of these administrations the important work of the Academy in the collection and study of scientific materials has gone forward, but three of them were characterized by certain outstanding features Dr Leidy's by great scientific and popular interest, especially in the weekly meetings, Dr Dixon's by the renovation of the old building and the new housing of the Academy in its present buildings, and Mr Morris' by the broadening sphere of the Academy's influence in bringing it into relation with the general public and especially the schools and educational institutions of this area

Under the leadership of Mr Morris, a comprehensive survey of the Academy's work and its relations with the scientific world, other learned societies, and this community was undertaken in 1935 and 1936. The result of this survey was the adoption by the Board of Trustees of an Educational Development Program which was announced at a large meeting on May 25th last, and a campaign was launched to raise the funds necessary to put this plan into operation. The objectives of the Educational Program, as Mr Morris announced them, were:—

1 To strengthen the scientific work now being done at the Academy and to provide for its future growth
2 To make the Academy a vital part of the educational system of Philadelphia through the organization of an Educational Department that would work with the children of the public and private schools of the city
3 The organization of the Department of Geology and Paleontology, which, building on the notable foundations in this field laid by Drs. Leidy and Cope, would develop a cooperative program of teaching and research and in particular would provide a world center for research on the problems of Early Man The inauguration of this program will take place at the coming celebration of the 125th anniversary of the Academy with an international conference and symposium on Early Man in which many of the leading authorities in this and other countries will take part

4 The creation of a dramatic and vital museum of natural history with modern educational exhibits that will instruct and interest old and young alike

Mr Morris took a leading part in the campaign for raising funds to put this program into effect He gave liberally of his time and money and, to a large extent through his personal efforts and prestige, a quarter of a million dollars in gifts has been received by the Academy

These are some of the most notable achievements of Mr Morris' administration of the Academy, and no one would have been more ready that himself to recognize the generous support which he received from his many friends and colleagues Indeed his ability to enlist the loyal cooperation of others was one of his outstanding qualities His own unselfishness and cooperation called forth similar responses in others For his unswerving loyalty, his transparent sincerity, his kindly sympathy, his wise counsel, his judicial poise, his high ideals, we who knew him were bound to him by bonds of the warmest affection, and we feel that we are stronger and better because we knew him "He rests from his labors but his works do follow him" Peace to his ashes, honor and love to his memory

Annual reports covering the year 1936 were presented by the Treasurer and the Managing Director, the former also reviewing the financial results to date of the Educational Development Program inaugurated the same year

The chair announced the appointment of the following individuals as members of the Committee on the 1937 Leidy Medal Dr William K Gregory (Chairman), Dr George H Parker, Dr Francis W Pennell, Dr Philip P Calvert and Dr Alexander G Ruthven

The following were enrolled as members since the February 1936 meeting of the Academy

Patron (1)

George Vanderbilt

Sustaining Members (7)

Mrs Frederick E Crockett, James H Gravell, John F Lewis, Jr, Mrs Howard A Loeb, Mrs A J Drexel Paul, M P. Quinn and Morgan H Thomas

Associate-Sustaining Members (15)

John C Atwood, Jr, W Curtis Bok, Alexander B Brock, Mrs Edward Browning, W. S. Carpenter, Jr, Miss Louise D Catherwood, Howard S Eckels, Christian Febiger, S Griswold Flagg, 3rd, J A Harris, 3rd, Mrs J A. Harris, 3rd, Charles W Henry, Henry Sheafer, Mrs W A Thompson, Herbert J Tily

Life Members (34)

John W. Angell, T D. M Cardeza, Mrs Radcliffe Cheston, Jr, Mrs Morris L Cooke, Mrs Henry B Coxe, Jr, James A Develin, Jr, T Munroe

Dobbins, Madame Marie el-Khoury, Mrs Bruce Ford, Lincoln Godfrey, Jr, Miss Janet P Jamieson, Mrs H LaBarre Jayne, Louise J. Kolb, Edward Law, Joseph Leidy, IV, Robert Mendenhall McIlvain, George H McFadden, Herbert C Morris, Mrs Arthur V Morton, George S Munson, Mrs H. S. Prentiss Nichols, Mrs Edgar Allen Poe, Mrs Benjamin B Reath, Mrs. Donner Roosevelt, Mrs Boyd Lee Spahr, Robert E Strawbridge, Archie D Swift, Roland L Taylor, Frank Graham Thomson, Mrs John B Townsend, Charles A Tyler, T F Dixon Wainwright, Mrs T F Dixon Wainwright, Miss Georgina P Yeatman

Contributing Members (108)

John Stokes Adams, W Wallace Alexander, Charles F Bach, Frank H Bachman, Frederic L Ballard, Mrs Donald B Barrows, Clarence W. Bartow, H H Battles, Wm W Battles, Edward F Beale, Mrs Samuel Bell, 3rd, Mrs Samuel Bettle, Henry Wolf Bickle, Moncure Biddle, Gilbert L Bishop, Jr, Henry G Brengle, Mrs Gouverneur Caldwalader, Alexander Cassatt, Jr, Robert K Cassatt, E W Clark, 3rd, J Lloyd Coates, Mrs Henry B Coxe, Mrs Thomas DeWitt Cuyler, H Hoffman Dolan, Mrs Wm H Donner, Furey Ellis, Mrs John K Ewing, 3rd, F J Fell, Jr, Thomas Fisher, Arthur A Fleisher, Dr Charles H Frazier, Mrs George H. Frazier, P H Gadsden, Dr Francis C Grant, Frank Tracy Griswold, Jr, Mrs Caspar W Hacker, Dr S McC Hamill, T Truxton Hare, Mrs Wm. W Harper, Dr Charles Hart, Leo H Heimerdinger, Mrs Edwin M Herr, Robert C Hill, Mrs Wm H Horstmann, Cooper Howell, Lardner Howell, Thomas W Hulme, William F James, Charles B Jennings, William Warner Justice, Jr, William H Kingsley, Mrs Wilbur Paddock Klapp, R H Knode, Irving Kohn, Mrs Laura Kuhn, Edwin M Lavino, E B Leisenring, Robert C Liggett, Christian R Lindbach, W H Loesche, C L Ludington, George McCall, John H McClatchy, Miss Selena B McIlhenny, Miss E. Gwen Martin, Miss Jane Graham Mason, Mrs Robert Montgomery, W H Montgomery, Jr, George E Nehrbas, Wm L Nevin, James C Newlin, George P Orr, George H Pabst, Jr, Mrs Howard Wurts Page, Mrs. Theodore S Paul, Mr Samuel K Phillips, David H Pleet, William Post, Alfred Putnam, Owen B Rhoads, Dr A S W Rosenbach, T. Edward Ross, Mrs Winthrop Sargent, Chas Chauncey Savage, Jr, Mrs Thomas Scattergood, Francis H Sheetz, Frank Seamans, Joseph W Sharp, Jr., Miss Mary W Shoemaker, Joseph A Slattery, Edward B Smith, Jr, Edward Starr, Jr, Herman W Stehfest, Leopold Stokowski, Leon C Sunstein, Paul Thompson, Walter S Thomson, Miss Mary T Tyler, Hon Robert von Moschzisker, Edward I Wagner, Mrs C Newbold Welsh, J Taney Willcox, Mrs Alan Wilson, Morris Wolf, Dr Stephen S Woolston, Charles C. Wriggins, Mrs Sydney L Wright, Peter A B Widener, III.

Annual Members (95)

Henry B Allen, Wm Downs Anderson, Miss Margaret Atkinson, William A Bache, Miss Emily Barclay, Robert Barry, II, Henry A Berwind, Jr, Mrs Charles Biddle, C Walter Borton, Jacob H Brodsky, Mrs Charles S Bromley, Coleman P Brown, John Pim Carter, Gerald W Caner, Wm J Conlen, Mrs David W Cherry, Mrs David S B Chew, Sydney P. Clark, Wm W Conrad, Richmond Bennett Cunningham, George F Curwen, Miss Mary DeHaven Dercum, Roy E Dickerson, Miss Eveline DuPont, Alban Eavenson, Miss Gertrude Ely, Van Horn Ely, Jr, Lionel Friedman, Miss Gertrude B Fuller, W Griffen Gribbel, Edward B Halsey, Thomas Hart, Miss Athalia E Hirst, Wm Macpherson Hornor, John K Howard, Dr B F Howell, Arthur E Hutchinson, Mrs S Pemberton Hutchinson, Mrs M Ray Jackson, Herbert Johnson, Rabbi Max D Klein, Mrs Frederick S Kirk, Henry H Lee, Jr, Miss Mildred W Lee, John Y LeFevre, Philip Ludwell Leidy, W P Lemmon, Wynne Laurence Le Page, Louis E Levinthal, Lewis N Lukens, Jr, Mrs Bispham McKean, Dr Elliston J Morris, Wm P Morris, Dr Marion E Park, Isaac A Pennypacker, Benjamin Perry, Dr Damon B Pfeiffer, Richard H Pough, Dr Warren S Reese, Mrs Howard Reifsnyder, Miss Julia Rush, Snowden Samuel, Otto W Schaum, Dr Lewis C Scheffey, Mrs Edgar Scott, Miss Susan B Sturgis Scott, Mrs Frank J Sheble, Charles H Shepler, Mrs Charles H Shepler, Dr Francis W Sinkler, Mrs Lewis L Smith, Miss Mary C Smith, C S Starr, Thomas Stokes, Mrs Walter Stokes, F Sturgis Stout, Miss Louise W Strawbridge, Ralph E Taggart, Lorraine S Tahl, G Brinton Thomas, Jr, Mrs Samuel Hinds Thomas, Mrs Marmaduke Tilden, Mrs James Van Buskirk, Edwin H Vare, Jr, Robert C Walker, J Harris Warthman, Orlando F Weber, Jr, Mrs Andrew Wheeler, Austin Wieand, William A Widersheim, 2nd, Mrs De Forest P Willard, Dr Horace James Williams, Alfred L Wolf, Mrs Charles R Wood, Edward H York, Jr

Junior Members (14)

Gordon Armistead, Miss Beatrice Anne Boericke, Orville H Bullitt, Jr, James Emlen, Bruce I Granger, Miss Ruth Hassel, Miss Mary Jane Hayden, Miss Caroline Molthan, Miss Jacqueline Molthan, Miss Lyndal Molthan, Miss Marian Molthan, Sidney Lee Postel, Putnam Schroeder, A Balfour Smith

Deaths of the following Members and Correspondents were announced

Dr William L Abbott, Dr James M Anders, Edward J Berwind, Kenneth M Blakiston, Francis B Bracken, Mrs Walter Clark, Robert M Coyle, Joseph Crawford, Samuel Emlen, Ralph B Evans, Dr Chas H. Frazier, Dr Herman Friele, of Bergen, Norway, a Correspondent, Wilfred

W Fry, Howard Fuguet, Chas Wm Funk, Caspar Wistar Hacker, John Gribbel, Dr T B Holloway, Dr A. P Karpinsky, President of the Academy of Sciences of the U.S S.R, a Correspondent, Edward C Knight, Albert Nelson Lewis, Horatio Gates Lloyd, H N Lowe, J Franklin McFadden, Frederick McOwen, A C Maron, George Lewis Mayer, Clarence B Moore, Effingham B Morris, President and Chairman of the Board of Trustees of the Academy, Miss Julia B Pratt, a Correspondent, Mrs Chas Roberts, Dr George D Rosengarten, Chas J Russell, Miss Hannah Lewis Scott, Chas K Shaw, Thomas H Shoemaker, Lowndes Taylor, Dr Bryant Walker, R W Wehrle, Maurice N Weyl, Daniel S White and Harry Whitney

Following their nomination as prescribed by the By-Laws, the following individuals were elected members of the Board of Trustees for a period extending to the Annual Meeting of 1940 Charles M B Cadwalader, Thomas S Gates, Rodolphe M de Schauensee, J Stogdell Stokes, Henry S Drinker, Jr, and Brooke Dolan, II

MINUTES OF THE INTERNATIONAL SYMPOSIUM ON EARLY MAN HELD AT THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

MARCH 17TH-20TH, 1937

IN CELEBRATION OF ITS ONE HUNDRED AND TWENTY-FIFTH ANNIVERSARY

On Wednesday, March 17th, the meeting was called to order at 9 40 A M in the Lecture Hall of the Academy by Dr Edwin G Conklin, Vice President of the Academy of Natural Sciences of Philadelphia Dr Conklin made a few opening remarks and then called upon Dr John C Merriam, President of the Carnegie Institution of Washington, to give the introductory address, after which the Chair was turned over to Dr Merriam, who called upon Dr G H R von Koenigswald, Paleontologist of the Dienst van den Mijnbouw, Bandoeng, Java, to give his paper entitled " Man's Geologic Record in Java " This paper was illustrated by slides

Miss Dorothy A E Garrod, Research Fellow, Newnham College, Cambridge, England, next presented her paper " The Near East as a Gateway of Prehistoric Human Migrations," illustrated by slides

Following this paper Dr Merriam turned the Chair over to Dr William K Gregory, Curator of the Department of Comparative Anatomy, American Museum of Natural History, who in turn called upon Mr Theodore McCown, Research Fellow of the American School of Prehistoric Research, to read the paper " Mount Carmel Man—His Bearing on the Ancestry of Modern Races," illustrated by slides, prepared both by Sir Arthur Keith and Mr McCown At the termination of the paper Dr Ales Hrdlička, Curator of Physical Anthropology, United States National Museum, presented a motion, which was seconded by Professor James H McGregor of Columbia University, that a vote of thanks should go to Sir Arthur Keith The Chairman put the vote to the audience who signified their unanimous approval by rising

Professor Brøgger, Professor of Archaeology, Kongelige Frederiks University, Oslo, Norway, was called upon to give his paper, illustrated with slides, entitled " Late Palaeolithic Man in Northernmost Norway " Professor Brøgger presented to the Academy of Natural Sciences of Philadelphia from the Instituttet for Sammenlignende Kulturforskning, Oslo, Norway, a volume entitled " Le Finnmarkien, les Origines de la Civilisation dans l'Extrême-nord de l'Europe " by Johs Bøe and A. Nummedal

The meeting was adjourned at 12:30 P. M

The afternoon session was called to order at 2.40 P.M by Dr George Grant MacCurdy, Director of the American School of Prehistoric Research. Dr. Paul Sears, Professor of Botany, University of Oklahoma, was immediately called upon to give his paper, illustrated with slides, entitled "Pollen Profiles in the United States as an Aid in Dating Cultural Deposits" Dr. Sears presented greetings to the Academy from the Governor of Oklahoma and the University of Oklahoma

Dr Horace G Richards, Research Associate of the New Jersey State Museum, then read a paper entitled "Pleistocene Mollusks as Indicators of Time and Ecological Conditions" The first part on land and freshwater forms was written by Dr Frank Collins Baker, Curator of the Natural History Museum of the University of Illinois The second half, on marine forms, was written by Dr Richards, and was illustrated by slides

Dr N C Nelson of the American Museum of Natural History then took the Chair, and Dr Philip S Smith of the Alaska Division of the United States Geological Survey presented his paper "Certain Relations Between Northwest America and Northeast Asia"

This paper was followed by a round table on European and African Chronology with Dr MacCurdy acting as Chairman The discussion was opened by a paper, illustrated with charts, by Mrs Alice Bowler-Kelley, in which was given a summary of the lower and middle Paleolithic facies in Europe and Africa The paper began with the type sections of the Somme Valley as based on the intensive studies of Abbe Breuil and the results compared with those obtained in other regions, among which were the Thames Valley and other regions in England, Northern France, Germany, Central and Eastern Europe, and Italy

The discussion which followed brought out many interesting points, and the paper itself was well received by both anthropologists and geologists A much fuller treatment of the subject was privately printed by Mrs. Bowler-Kelley[1]

The meeting was adjourned at 5 15 P M

In the evening a buffet supper was held for the scientists and their guests at seven o'clock in the Library of the Academy At nine o'clock the Hall of Early Man was formally opened.

Thursday (March 18th) morning's session was called to order by Dr Alexander Wetmore of the United States National Museum at 9.45 Dr. Ales Hrdlička was called upon to give his paper "Early Man in America—What Have the Bones to Say About It?" Dr Hrdlička illustrated his paper with actual specimens of bones, a slide, and statistics on the blackboard

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[1] "Lower and Middle Palaeolithic Facies in Europe and Africa" by Alice Bowler-Kelley, 10 rue Alasseur, Paris XV, France

When Dr Hrdlička terminated his paper Rev Henry Retzek of West Union, Minnesota, asked for permission to speak from the audience. He announced his intention of giving a short speech on the subject of the Minnesota finds at the round table on North American Chronology to be held that afternoon Dr Sellards was also recognized by the Chair He announced the presence of the Vero (Florida) skull in the Hall of Early Man

Dr Herbert J Spinden, Curator of Primitive and Prehistoric Art at the Brooklyn Museum, gave his paper "First Peopling of America as a Chronological Problem"

"Glacial Stratigraphy of North America," illustrated by slides, was presented by Dr Paul MacClintock, Professor of Geography, Princeton University.

Dr Wetmore turned the Chair over to Dr Kirk Bryan, Associate Professor of Physiography, Harvard University

Dr Ernst Antevs, Research Associate of the Carnegie Institution of Washington, presented his paper "Climate and Early Man in America," illustrated with slides

Mr Harold S Gladwin of Gila Pueblo, Globe, Arizona, gave a paper, illustrated with slides, entitled "The Significance of Early Cultures in Texas and Southeastern Arizona"

Dr Clark Wissler of the American Museum of Natural History then took the Chair Dr Kirk Bryan's and Dr Frank Roberts's papers were shifted from their original positions on the program, and Mr Frank M Setzler of the United States National Museum was called upon to read Dr Frank H H Roberts, Jr's paper in his absence This was entitled "The Folsom Problem in North American Archaeology"

Dr Bryan presented his paper "Geology of Folsom Sites in New Mexico and Colorado," illustrated with slides

Dr Morris M Leighton's paper, originally scheduled for 12 00, was postponed until the afternoon

The meeting was adjourned at 1.10 P M

The afternoon session was opened at 2 40 with Dr Ralph W Chaney of the University of California in the Chair Dr Edwin H Colbert of the American Museum of Natural History and the Academy of Natural Sciences of Philadelphia was called upon to read his paper "The Pleistocene Mammals of North America and Their Relations to Eurasian Forms," illustrated with slides

Mr C Bertrand Schultz of the University of Nebraska read his paper entitled "Pleistocene and Post-Glacial Mammals of Nebraska," illustrated with slides

Dr Elias H Sellards, Director of the Bureau of Economic Geology of the University of Texas, was called upon to present his paper "The Significance of the Vero (Florida) Finds," illustrated with slides

Dr Chaney turned the Chair over to Dr. George F Kay, Professor of Geology and Dean of the College of Liberal Arts of the State University of Iowa Dr Kay, in turn, called upon Dr Morris M Leighton, Chief of the Illinois Geological Survey, to present his paper, illustrated with slides, entitled "The Significance of Profiles or Weathering in Archeological Stratigraphic Studies," which had been postponed from the morning session.

The round table on North American Chronology was called to order at 4 20 by Dr Kay, and was adjourned at 5 50 The discussion was opened by Mr Harold S Gladwin, of Globe, Arizona, asking whether any method was at present recognized by Pleistocene geologists whereby the ice sheets in the New World could be correlated with those of the old This phase of the subject, however, did not seem to hold the interest of those taking part in the round table as did discussion of the Minnesota Man The geological aspects of this problem brought out lively discussion in which Dr Antevs took the stand that the varves at the site showed slipping Dr Hrdlička insisted that the skeleton was that of a modern Indian Others were equally emphatic that the skeleton was of the same age as the silt, and that no landsliding had taken place

Friday (March 19th) morning's session was called to order at 9 45 with Dr Nelson in the Chair Dr Nelson called upon Père Teilhard de Chardin of the National Geological Survey of China to present his paper entitled "Late Cenozoic Correlations Between North China, Malaysia and Central Europe" This paper was illustrated with slides

Father Teilhard was asked to present a paper entitled "The Palaeolithic Industries in China" by Dr W C Pei of the Institut de Paléontologie Humaine, Paris This discussion of Dr Pei's work was illustrated by a slide

Professor V Gordon Childe, Professor of Prehistoric Archaeology of the University of Edinburgh, presented his paper "The North Eurasian Forest Cultures in the Mesolithic and Neolithic Phases," illustrated with slides

Dr William K Gregory read a paper, illustrated with slides, entitled "The Evidence of the Dentition on the Origin of Man," which was written by Dr Milo S. Hellman, Research Associate in Physical Anthropology of the American Museum of Natural History, and Dr Gregory.

Dr Hellmut de Terra, Research Associate of the Carnegie Institution of Washington and Associate Curator of Geology and Paleontology at the Academy of Natural Sciences of Philadelphia, presented a paper, illustrated with slides, entitled "Records of Early Man in the Siwalik Hills of India."

Dr Daniel S Davidson, Assistant Professor of Anthropology of the University of Pennsylvania, read a paper "Antiquity of Man in the Pacific and the Question of Trans-Pacific Migrations," illustrated with one slide

The meeting was adjourned at 1 10 P M

The afternoon session was called to order by Dr Conklin at 2.35.

A resolution, submitted at the suggestion of many delegates, was presented to the meeting by Dr Spinden and was seconded by Dr Kay The resolution is as follows.

> To celebrate its Hundred and Twenty-fifth Anniversary the Philadelphia Academy of Natural Sciences has inaugurated a new kind of scientific congress It is called a Symposium on Early Man but it might be described further as a Master Key Symposium for it has been planned to solve problems which are common prerequisites in all branches of natural history.
>
> Be it resolved, therefore, by the men and women privileged to take part in these memorable proceedings, and who represent widely different disciplines of thought, to unite in expressing our deep thanks to the Philadelphia Academy of Natural Sciences and especially to Dr Edgar B Howard, for the exceptional opportunity here offered
>
> We also express the hope that the plan here initiated will be repeated in future meetings
>
> In adopting this resolution it is requested that the organizing committee of this Symposium of Early Man be continued as a standing committee to give consideration to the desirability of future similar meetings and to study in connection with future reported significant discoveries of human remains the most effective methods of investigating these discoveries from all related scientific standpoints

The resolution was carried unanimously by the meeting

Dr Conklin turned the Chair over to Dr Kaj Birket-Smith of Copenhagen Dr. Elmer D Merrill, Administrator of Botanical Collections, Harvard University, and Director of the Arnold Arboretum, presented his paper "Domesticated Plants in Relation to Diffusion of Culture"

The paper by Professor Jozef Kostrewski of Poznan University, scheduled on the program, was not presented

Dr Earnest A Hooton, Professor of Anthropology, Harvard University, presented his paper entitled "Biology and Fossil Man."

Dr. Conklin announced that because of the advanced hour and the interest in the round table on Folsom and Yuma Points the round table on Asiatic Chronology would be postponed until two o'clock Saturday afternoon.

The round table on the Typology and Distribution of Folsom and Yuma Points, held in the Academy's Department of Geology and Paleontology, with Mr Neil Judd, Curator of Archaeology of the United States National Museum, in the Chair, was opened with a paper by Miss Marie Wormington, Curator of Archaeology of the Colorado Museum of Natural History, and

Miss Betty Holmes, also of the Colorado Museum. This paper dealt very fully with the typological differentiation between Folsom and Yuma points and was illustrated with detailed charts showing the patterns and relationships of the varied types Much interest was aroused by this paper and full discussion of all angles of the Folsom problem followed At 5 45, the discussion still continuing, it was moved to adjourn and continue again in the morning

A reception for the visitors to the Symposium was given by the University of Pennsylvania Museum at eight o'clock that evening There was an academic procession and an awarding of honorary degrees to three of the foreign scientists by the University of Pennsylvania The recipients of these degrees were Miss Dorothy A E Garrod, Dr Kaj Birket-Smith, and Professor V Gordon Childe Dr William Berryman Scott, of Princeton University, gave an address entitled "The Pioneers Leidy, Cope, Marsh, and Osborn"

The round table on Folsom and Yuma points was opened on Saturday morning (March 20th) where discussion left off the previous afternoon, with Mr Judd again acting as Chairman The meeting was opened with the suggestion that the most important phase in a further study of the whole problem was to arrive at definitions of both a Folsom point and a Yuma point that would be acceptable to those at the meeting The Chairman, therefore, appointed a Committee to consider the matter and report back during the course of the morning Mr Gladwin was appointed Chairman, the other members being Miss Wormington, Dr Renaud, Mrs Schultz, Dr Golomshtok, and Mr Cotter

In reporting back, Mr Gladwin pointed out that the classifications which the Committee were submitting were generic and that they were not related to chronology or to distribution On this basis the Folsom point was defined as "a leaf-shaped blade It has a varying base, neither barbed nor stemmed It is fluted on one or both sides, wholly or partially It is pressure-flaked from both sides" And the Yuma point was defined as "triangular It runs from triangular, through parallel sides, to leaf-shaped Its base is either straight or convex or concave It is frequently stemmed, but when stemmed, has parallel sides—the sides of the stem are parallel It is never fluted It is pressure-flaked from both sides, the flakes being parallel." After much discussion these definitions were accepted and a motion passed to that effect

The regular Saturday morning session was opened with Dr MacCurdy in the chair who turned the meeting over to Dr Hrdlička Dr Robert Broom, Keeper of Vertebrate Paleontology and Anthropology of the Transvaal Museum, Pretoria, South Africa, was then called to give his paper entitled "Australopithecus and its Affinities," illustrated by slides.

Dr. MacCurdy read by title the following papers which had been sent in for the Symposium:

"The Confins Man, a Contribution to the Study of Early Man in South America," by H V. Walter, Dr A Cathoud, and Professor Anibal Mattos of the Academy of Science of Minas Geraes, Brazil

"The Place of Homo Soloensis Among Fossil Man," by Dr. W. F F. Oppenoorth, Zeist, Holland

"Early Man and Geochronology," by Gerard de Geer, Stockholm, Sweden.

"On the Stone Age of Japan," by Professor Dr R Toru, Dean of the Faculty of Literature of Sophia University, Tokyo, Japan

"Some Observations on the Remains of a Pleistocene Fauna and of the Palaeolithic Age in Northern Manchuria," by A. S Loukashkin, Head of the Harbin Museum of Manchuria

Dr. Kaj Birket-Smith next presented a paper entitled "Eskimo Cultures and Their Bearing on the Prehistoric Cultures of North America," illustrated with slides

Dr Oswald Menghin, Professor of Prehistoric Archaeology of the University of Vienna, presented his paper, illustrated by slides, entitled "Autochthonous and Migratorial Trends in the Evolution of Palaeolithic Tools."

Dr George Pinkley of the American Museum of Natural History briefly summarized a paper entitled "Early Man in Java and Pithecanthropus Erectus" just received from Professor Eugene Dubois of Haarlem, Holland

Dr Wissler then briefly summarized the Symposium as follows.

"I am supposed to make certain apologies for Dr MacCurdy We all recognize that Dr MacCurdy is the finest gentleman in the world, and I assume that when he was asked to make this summary of this conference he was too much of a gentleman to refuse

"I am not surprised, however, that he is not here at this moment Any type of a summary would be out of the question, I take it, by me I am sure that you have all heard in the corridors and in the hotels the expression that this is one of the most interesting and important meetings we have ever attended I think it is

"However, I have frequently been asked whether this meeting would result in any formulated conclusion or opinion concerning the subject in hand It probably will not, nor do I think we should be disappointed on that account This is a unique meeting but there have been similar conferences in other fields And I venture to make a prediction as to the results of this conference based on what happened in a similar conference.

"It was my pleasure to attend, a number of years ago, a conference on the scientific study of human marriage. There were gathered in that conference some of the most able and distinguished men in certain aspects of the medical profession—in psychiatry, in biology, in physiology, in sociology, and in economics In that respect it represented the cross-section of the various fields of inquiry that might be pertinent to that subject. The session was of the same length as yours, it ran through the same number of days. The programs were long, the papers were continuous. But it was the feeling of those who left that conference that the problem of marriage and its scientific approach would never look as it did before It is also true that the proceedings of that conference are still used by people who want to take up serious inquiry on this field and looked upon as a guidance toward the use of right methods

" Now, I suspect that this conference will result in something like this: There will be no formal resolutions The only resolution that the conference on the study of marriage made was to thank their host, and I believe you have already done that. They passed no other resolution I think no other resolution will be passed here.

" My remaining function is, on behalf of this Academy and of the American members of this conference, to express our appreciation to our foreign guests and those who have participated in the discussion We feel that the outcome of this meeting, the satisfactory termination and the great stimulus that we have derived therefrom has been largely due to the participation of our distinguished foreign guests And I wish especially to extend to the foreign members of this meeting our sincere appreciation "

The following remarks were then made by Dr Childe

" I just want to express on behalf of the foreign guests how very grateful we are for the privilege of participating in this Symposium It has been a tremendous stimulus to us to see just how the Academy has secured such magnificent co-operation between all the branches of science concerned with ancient man And we shall take back not only a great deal of information, but a very inspiring reminiscence And I wish to express on behalf of the foreign visitors our very great gratitude to the Academy and to Dr. Howard "

The meeting was adjourned at 12·05 P M

The round table on Asiatic Chronology was called to order at 2 15 by Dr de Terra who gave a brief summary of salient points which had emerged from the presentation of papers read during the Symposium concerning Pleistocene stratigraphy in China, Java, and India, with reference to Early Man It was proposed that the evidence should be explained on which the dating of early human remains rests in the three areas, and that a common understanding be reached about the Plio-Pleistocene boundary in southern Asia

Following the presentation of the three stratigraphic columns it appeared that in these three regions the lower Pleistocene has so far yielded no sure traces of human existence. The early middle Pleistocene presents a fairly uniform emergence of primitive human types belonging to the Peking and Java Man group In the course of the discussion it became evident that the Djetis fauna containing the newly-discovered infant skull from Modjokerto, Java, is of middle instead of lower Pleistocene age, as had previously been thought This correlation is supported by the fact that in both Java and India the middle Pleistocene is divided from the lower and upper Pleistocene by marked unconformities of structural origin

Following a request by Dr D Garrod, the question of the age of the Chinese loess and associated cultures was brought up for discussion Father Teilhard replied by saying that the correlation of the loess with the Wurm glaciation in Europe was arbitrary and that detailed studies were required for elucidation of the loess composition, but that there was certain evidence to show that the loess was not a massive unit, as has been assumed, but consisted possibly of two zones, separated from each other by a period of erosion and river action

The meeting was adjourned at 4 15 P M after the members had passed a resolution, proposed by Dr Ralph Chaney, as follows

" I wish to express at this meeting a resolution that the Secretary of the Symposium express to Dr Merriam our satisfaction at the progress of these later days of the Symposium, as well as the earlier ones, and our appreciation to him for his support and guidance in what we consider an important scientific conference "

EDGAR B HOWARD,
Secretary of Symposium

THE JOSEPH LEIDY MEDAL,—FIFTH AWARD

A committee on the Leidy Medal was appointed by the Board of Trustees of the Academy, January 22, 1937, to select the recipient of the Fifth Award of the same

The personnel of the Leidy Medal Committee consisted of Dr William K Gregory, Curator of Fishes, American Museum of Natural History (*Chairman*), Dr George H Parker, Emeritus Professor of Zoology, Harvard University, Dr Alexander G Ruthven, President, University of Michigan, Dr Francis W Pennell, Curator of Botany, Academy of Natural Sciences of Philadelphia, Dr Philip P Calvert, Professor of Zoology, University of Pennsylvania and Research Associate of the Academy of Natural Sciences of Philadelphia

In accordance with the selection made by this Committee in its report, the Fifth Award of the Leidy Medal was made by the Academy to Dr Edwin Linton, Research Fellow in Zoology at the University of Pennsylvania, for his important and long-continued researches in parasitology The formal presentation of the Medal took place at a meeting of the Council of the Academy held December 7, 1937, and at which a number of members of the Academy, of its staff, and invited guests were also present

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Dr Edwin Linton was born at East Bethlehem, Penna , March 14, 1855 As a young man he taught school for several years before entering college His undergraduate work was done at Washington and Jefferson College, from which he received his A B in 1879 His graduate study was carried on at Yale University in 1881 and '82, and from this institution he received his Doctorate of Philosophy in 1890 He held the post of Instructor in Mathematics at Washington and Jefferson College from 1879 to 1881, and the professorship of Biology and Geology there from 1882 to 1920, becoming Emeritus Professor the latter year Now an Honorary Fellow in Zoology of the University of Missouri and Parasitologist of the Medical Department of Georgia, he has since 1926 been actively associated with the University of Pennsylvania as a Research Fellow in Zoology

Dr Linton's first scientific publication appeared in 1887, when he published a brief paper on a trematode found in the albumen of a hen's egg The interest in parasitic worms thus early established continued undiminished, and his latest paper, as yet unpublished, deals with the same organisms Between 1887 and the present time more than one hundred contributions have issued from his pen These have covered the entire field of worm parasites, but more especially the cestodes or tape-worms and trematodes or flukes of fishes and fish-eating birds His studies of the life-histories of these worms have been of particular importance, involving as many of them do fishes and birds or sharks in their life cycles As an illustration, in 1890 he studied the tape-worm *Dibothrium cordiceps* Leidy, the larval stages of which are found infesting the trout of Yellowstone Lake and the mature worms in the white pelicans that breed on the small Molly Island in that lake

In 1882, Dr Linton was appointed Prof Verill's assistant at Wood's Hole, where Professor Spencer Baird was already planning to locate the Fisheries Laboratory Here Linton was associated not only with Baird, but with Ryder, Gill, Goode, and other contemporary zoologists of distinction This early association with Baird profoundly influenced Dr Linton's career, in its establishment of life-long connections with the United States Bureau of Fisheries and the United States National Museum While his studies at Wood's Hole have been continued over a long period of years (1882-1887, 1889, 1898-1900 and regularly since 1903) his investigations have taken him to Yellowstone Park in 1890, to the Beaufort Fisheries Laboratory in 1901-1902, to Bermuda in 1903, and to the Carnegie Institution Tortugas Laboratory in 1906-1908

In his chosen field of research Dr Linton has been a pioneer, as Leidy, the only active American worker in animal parasitology at the time of Linton's first studies, was little concerned with the parasites of marine fishes, upon which Linton did most of his early and most extensive studies In part at least to the early studies of these men the present broad interest and extensive research in parasitology in America is due

While Dr Linton's papers abound in descriptions of new species, his real interests have lain in the broader domain of life histories, host-parasite relations, ecology, and anatomy He was also concerned with the practical bearings of parasitology and aided in the solution of problems of this kind affecting the fisheries and human welfare

In recognition of his researches Dr Linton received a silver medal at the Paris Exposition of 1900, and holds membership in a number of learned societies In 1925 he was honored with the Vice-Presidency of Section F (Zoology) of the American Association for the Advancement of Science

OFFICERS ELECTED

At a meeting of the Board of Trustees the following officers were elected

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INDEX TO THE GENERA AND SPECIES DESCRIBED AND REFERRED TO

New Species and Genera are Indicated by Bold Face Numerals

abbreviatus, Gerres, 238
abietina, Castilleja, 430
abildgaardi, Sparisoma, 314
Abracris 356
Abudefduf, 246, 248, 313
acanthias, Squalus, 297, 304
Acanthoperca, 230
Acanthopsis, 152
acerata, Acraea, 371
Achirus, 305
Acraea, 370-372
actisanes Ergolis, 375
aculeata, Rhynchobdella, 222
aculeatus, Halieutichthys, 314
acuminata Paulinia, 351
acuta, Dussumieria, 130
acutirostris, Phrynobatrachus 295
adscensionis, Holocentrus, 310
adspersum Cichlasoma, 313
adspersus, Tautogolabrus, 303
adustus Pomacentrus, 313
aeneo-oculata, Vilerne, 356
aeneus Brachirus, 216
aestivalis Pomolobus, 304
affinis, Timotes, **365**
africanus, Algiroides, 283
Agama, 281
Agis, 107-117
Aglais, 408
Agriacris, 352
alalunga Germo, 306
alaskensis, Brenthis 402
alba, Colias, 394
albida, Ypthima, 373
albolabris Rana, 294
alcippus, Danais, 370
Algiroides, 283
Allotettix, 347
albicollaris, Leiocassis, 150
albopunctatus, Scaphiophis, 275
Albula 304
Albulichthys, 174
albuloides Albulichthys, 174
Alepes, 224, 226
alaska, Papilio, 392
alleteratus, Euthynnus, 306
Allotettix 347
Alosa, 304
altus, Barbus, 198
Alutera, 264, 314
Amauris, 370
Ambassis, 230, 232
amblyceps, Cryptocheilichthys, **187**
Amblyrhynchichthys, 174
Amblytropidia, 348
americana, Morone, 307
americanus, Ammodytes, 308
    Hemitripterus, 302
    Pseudopleuronectes, 305
Amia, 232
Ammodytes 308
Amorphopus 347
amyntula, Lycaena 411
Anabas 222
analis, Lutjanus, 311
Anapheis, 379
Anchoviella 131, 304, 309
Andriana, 320
aneus Johnius, 240
Angelichthys 313
anguillaris, Enchelyopus, 308
    Plotosus 133
    Taenioides, 257
angulatus, Tropinotus, 352
anicia Melitaea 403
Anisotremus, 311
Antanartia, 373
Antennarius, 314
antennatus, Amophopus, 347
    Paratettix, 348
Anthias 300
Antigonia, 302
antiops, Aglais, 408
Apeltes, 306
Apocryptodon, 257
apogon Cyclocheilichthys, 184
Appias, 378
Aragoa, 425-432
Archosargus, 311
arcticeps, Cypselurus, 216
arctifrons, Calamus, 311
arel, Cynoglossus, 218
arenatus Priacanthus, 311
argenteus, Otolithes, 240
argia, Nepheronia 380
argus Scatophagus, 246
Argynnis, 373 399
argyrotaenia, Rasbora, 169
arietans, Bitis, 280
armatus Cyclocheilichthys, 186
arsius Pseudorhombus 216
Arthroleptis, 295
ashmeadi, Barbus, **198**
asterope, Ypthima, 373
Astrapogon, 311
Astylosternus 293
Aterica, 376, 377
Atherina, 220
Atheris 280
atlantis, Argynnis 399
Atractaspis, 280
atricollis Agama, 282
atridorsalis, Mystacoleucus, **176**
atrifasciatus Mystus, **146**
atripinnis Hemipimelodus, **145**
atropos, Atropus, 226
Atropus, 226
attu Wallago, 133
aubryi Leptopelis 291
Aulostomus 310
auriflamma Mulloidichthys, 238
aurorubens Rhomboplites, 311

Bagarius 144
bagarius Bagarius, 144
Bagre, 305
bahianus Hepatus 313
Bairdiella 307
Balantiocheilus, 200
Balistes, 307
balloui Orphulella 349
Barbichthys 200
Barbus 188-198
Barilius, 212
barroni Culter 164
bartholomaei Caranx, 310
Basilarchia 408
batesi Nauphoeta, 74
Bathystoma 311
batrachus Clarias 133
beasleyi Barbus **194**
beavani Nemacheilus, 156
beebei, Gambusia, 309
behri Labeo **206**
Belenois 379

Belodontichthys, 134
berbis, Macilentichthys 226
beryllina, Menidia, 305
beryllinus Cryptotomus 313
bicaudalis, Lactophrys, 314
bicirrhis, Kryptopterus, 136
bicolor, Labeo, 201
bifasciatum, Thalassoma, 313
bilinearis, Merluccius, 298, 305
bilineata, Paraplagusia, 216
bimaculatus, Ompok 134
bindus, Leiognathus 228
binotatus, Barbus, 198
Bison 11
bitaeniata, Nemablatta, 18
bitaeniatus, Chamaeleo 288
Bitis 280
blandingii Boiga, 276
Blepharis 310
blochii, Leiognathus 228
Trachinotus, 226
Boaedon 271, 272
bocagii, Prosymna, 275
bocourtii, Heterobagrus, 150
Boiga, 276
bolivari, Thymochares, 324, **326**
bonariense, Haemulon 311
bonasia, Acraea, 371
bonasus Rhinoptera, 304
bondi, Dicrurus, **337**
boops Selar, 224
borneensis Cynoglossus, 218
Hemipimelodus 144
bosc Gobiosoma, 308
Bothiopthalmus 271
Botia, 154 156
Brachirus, 216
brachiusculus, Grammicolepis, 208
Brachygobius, 248 250
Brachymystus, 148
brachypterus, Parexocoetus, 216
brachysoma, Harengula, 131
brasiliensis Hemiramphus, 309
Brenthis 401 402
brevirostris Triacanthus 262
brevis Barbus, 198
Brevoortia 304
bromius Papilio 381
brookei, Ochotona **341**
brookii Hemidactylus 281
browni Antigonia, 302
Bufo 289-291
burgini Pangasius, 141
burmensis Ambassis, 232
Butis, 248
butis Butis, 248
Byblis, 375
caelatus, Tachysurus, 144
caenis, Cymothoe, 377
caeruleus, Hepatus, 313
Calabaria, 270
Calamus, 311
callarias, Gadus, 298, 305
Callionymus, 258
Callyodon, 314
camerunensis, Bufo, 290
camillus, Cyrestes, 376
campestris, Phyciodes, 405
canadum, Rachycentron, 226, 307
canciloides, Xenentodon, 215
caninus, Ctenogobius, 252
canis, Mustelus, 303
Cantherines, 314
capelloi, Leucophaea, 52, 62
capense, Lycophidion, 272
capensis, Mehelya, 272
capistratus, Chaetodon, 313
Carangoides, 226
Caranx, 226, 307, 310
Carcharias, 303
cardui, Pyrameis, 374
carolinensis Balistes, 308
carolinus Prionotus, 302, 307
Trachinotus, 307
carpio Cyprinus, 173
carrikeri, Chibchacris, **362**
Cassio, 235
Castilleja, 419-432
cataphractus, Oxytettix, **317**
Catlacarpio 178
Catopsila, 380
caudalis, Halichoeres 313
caudatus, Micronotus, 348
Cauratettix **349**, 350
Causus 279
cayennensis Allotettix, 347
cebrene, Junonia, 374
Centriscus, 219
Centropomus, 310
Centropristis 300, 307
Cephalopholis, 234, 310
Cercyonis, 396
cervinum, Lepophidium, 303
Cervus 11
Cetengraulis, 309
Chaetodipterus, 313
Chaetodon, 246 313
Chamaeleo 287-289
Chanda, 230
Channa 222, 224
chapini Rana, 293
Charadrius, 340
Charaxes 378
chariclea Brenthis, 401
chatareus, Toxotes, 246
Cheilinus, 248
Chelmo, 246
cheroni Rasbora, **168**
chevoyi, Labeo **205**
Chibchacris **361**, **362**
Chilomycterus, 308
chilopterus, Mystacoleucus, 176
chinensis, Monacanthus, 262
chipmani, Inusa, 355
Chirocentrus, 130
Chlorophis, 273
Chloroscombrus, 310
chlorurus, Cheilinus, 248
choirocephalus, Stephanolepis, 262
choirorhynchus, Acanthopsis, 152
Chonophorus, 314
christina, Colias, 395
chromosa, Castilleja 421
chrysippus Danais, 369
chysonome, Colotis, 380
Chrysophanus, 409
chrysophrys, Carangoides, 226
chrysops Stenotomus, 300, 307
chrysopterum Sparisoma, 314
chrysura, Bairdiella, 307
chrysurus Chloroscombrus, 310
Ocyurus, 311
chulae Vaimosa, 251
chuss Phycis, 298, 305
Cichlasoma, 313
ciliaris, Angelichthys, 313
ciliatus Monacanthus, 314
cinerea Nauphoeta, 87
cinereus Gerres 313
circumdata, Nauphoeta **91**
Cirrhinus, 173
Clarias, 133
Clarisilurus **188**
clarissa, Mylothris, 379
clavigera, Euandroblatta, **48**
cleia Junonia 374
clokeyi, Castilleja, **420**
Clupeoides 131
coatesi, Tylognathus, **208**
coccinata, Cymothoe, 377
Coilia, 132
Colias, 380, 392-396
colias, Scomber, 306
colemani Barbus, **197**
colonensis Stellifer 311
colorata Pediella, **358**
Colotis 380
Colpolopha, 353
columbia, Parelephas, 11
commerson, Scomberomorus, 224
commersonii, Anchoviella, 131
conchifer Zenopsis 298
concinnula Orphulella 349
concolor, Hyperolius, 292
Conger, 296, 305

conger, Conger, 298, 305
congicus, Leucophaea, 52, 59
Congrua, Omura, 352
cordyla Magalaspis 224
coriaceus, Rypticus, 311
Corica 131
Cornops, 356
Coryphaena 307
Coryzichthys, 262
Coscineuta, 356
Cosmochilus, 183
crassipes Rana 293
  Thymochares 324
crinitus, Blepharis 310
cristata, Eutropidacris 353
  Chamaeleo, 289
crocodilus, Lycothrissa 132
croiceneus Callyodon 314
cromiei Rasbora 167
cromis, Pogonias 307
Crossoptilon 339
Crotaphopeltis, 275
Cryptocentrus 254 256
cryptopterus, Kryptopterus, 136
Cryptotettix 320
Cryptotomus 313
Ctenogobius 252
Culter 163-166
cultratus Peteropangasius 144
cuning Cassio, 235
cupressina Aragoa 431
curema, Mugil 305, 310
curta Euandroblatta 28
cyanipes, Scyllina, 351
cylindrodes, Opshomala 355
Cyclocheilichthys 184-187
Cyclopterus 307
Cymothoe, 377
Cynoglossus 216-219
cynoglossus, Cynoglossus 219
Cynoscion 300, 307
Cyrestes 376
Cyprinodon 305
cyprinoides Megalops, 128
Cyprinus 173
Cypselurus 216

damocles, Amauris, 370
Danais, 369 370
Dangila, 176 177
Danio 169
dardanus, Papilio 381
daruphani Barbus, 190
darwini, Gephyroberyx, 298
Dasyatis 128
Dasypeltis, 275
daura, Leiognathus, 228
davisi, Tylognathus, 208
Decapterus 310
deignani, Kryptopterus, 136
delius, Antanartia, 373
demodocus, Papilio, 382
Dendraspis, 279
dentatus, Paralichthys, 298, 305
dentex, Odontoscion, 311
Dermogenys, 214
desmotes Nemacheilus, 156
diabolica Meridacris, 359
diacanthus Johnius, 240
  Serranus, 234
diadematus, Astylosternus, 293
diaphanus Fundulus, 305
Diapterus 313
Dichotomycter, 264
Dicrurus 337
dinema, Belodontichthys, 134
Diodon, 314
Diplectrum, 311
Discolabeo, 210, 211
dispar, Petroscirtes, 258
Dispholidus 277
dispilonotus Harengula, 131
dispilurus Eudulus 311
djaiong, Syngnathus, 219
djedaba Alepes, 326
dolani, Crossoptilon, 339
dorab Chirocentrus 130
Dormitator 314
Drepane 246
dubius Polydactylus, 220
duchaillui Agis 108 109
dukai Lissochilus, 188
dumerilii Cyclocheilichthys, 186
dunckeri, Zenarchopterus 214
duodecimalis Atherina, 220
duostigma Osteochilus, 182
dussumieri Johnius 240
  Sciaena, 242
Dussumieria 130
dyocheilus, Varicorhinus, 188

edentulus Cetengraulis 309
edwardsi, Apocryptodon, 257
egialea, Amaurus 370
eglanteria Raja 297, 304
Elapops 278
Elapsoidea, 278
electo Colias 380
elegans, Feylinia 287
  Nauphoeta 76
Eleotris 248
Eleutheronema 220
emarginata Phacoparia 356
emblemmaticus Callyodon, 314
encedon, Acraea, 371
Enchelyopus, 308
enoplus Cyclocheilichthys, 184
enotrea, Ergolis, 375
ensiferus Centropomus, 311
Enulius 415-418
epilamproides Nauphoeta, 76
epipsodes, Erebia 399
epsetus, Anchoviella, 304 309
Eques, 312
equula, Leiognathus, 228
equulaeformis, Gazza 230
Equus, 11
Erebia 397-399
Eremias 283
Ergolis 375
erosa, Kinixys, 269
erumei, Psettodes 216
erythropterus, Lutjanus, 235
erythrorinchus Hemirhamphus, 214
erythrospila, Menkongina, 200
erythrura Labeo 204
Esomus, 170
etheocles Charaxes, 378
Euandroblatta 23-46
Eucinostomus, 313
Eudulus, 311
eugeneius Pseudobatrachus, 260
Eulamia, 304
Eumastax 348
eupale, Charaxes, 378
Euphaedra 377
Eurytela 375
Euthynnus, 306
Eutropidacris 353
exanthematicus, 282
exilis Clupeoides 131

faber, Chaetodipterus, 313
Fanoblatta 119
fario Serranus, 234
fasciacauda Garra 212
fasciatus Achirus, 305
  Hemidactylus 281
  Leiognathus 228
  Pristolepis 242
favus, Mastacembelus 222
fernandi Riopa 286
Feylinia, 287
fictor Agis 108 111
filamentosus Gerres 238
Filirasbora, 172
fisheri, Discolabeo 211
Fistularia, 309
flavescens Perca, 307
flavipes, Lutjanus 235
flavitorques, Enulius, 415
flavolineata, Osmilia 356
flavolineatum Haemulon 311
flexivitta Nauphoeta 77
florella, Catopsila 380
floridana Huro 307
fluviatilis Callionymus 258
  Dychotomycter, 264
foxi, Barbus, 188
fraseri, Xenopus 289
freminvillii, Myliobatus, 304

frenata, Nauphoeta, 73
frenatus, Labeo 202
    Lethrinus 238
fulviflamma, Lutjanus, 235
Fundulus, 305
funebris Mycalesis 373
funereus, Bufo 290
furcatus, Nemasiluroides, **188**
fusca Eleotris, 248
fuscata Precis, 374
fuscus Brachygobius 250
    Pomacentrus 313
    Syngnathus 306

gabonensis Pelusios, 269
gabonica Bitis 280
Gadus 298, 305
galamensis, Rana 294
galeatus Thymochares, 324
galene Aterica 377
Gambusia 309
gangeae Coryzichthys, 262
garnoti Halichoeres, 313
Garra 211 212
Gastropyxis 274
Gazza 230
Gephyroberyx 298
Germo 306
Gerres 238 313
gibbosus, Pomotis 307
giurus Glossogobius, 252
glacialis, Colias 393
gladius, Istiophorus, 224
    Xiphias 306
glaucus Trachinotus, 310
Glossogobius 252
Gobiella 248
Gobiosoma 308
Gobius 314
goddardi Esomus **170**
gogirzae Prosopodasys, 242
goliath Rana 293
golo Mycalesis, 373
gracilis Cauratettix, **350**
    Chamaeleo, 288
    Polygonia 408
    Tylognathus **209**
Grammicolepis 298
Grammoplites 244
grandis Leucophaea 52, 60
Grayia 274
gregorii Precis 374
griseum Hemiscyllium, 128
griseus, Lutjanus 311
grunniens Pomadasys, 235
guachancho Sphyraena, 310
gudgeri Xenocheilichthys, 174
guineensis Hemisus, 295
gula Eucinostomus 313
guntheri, Elapsoidea, 278
guttatus Serranus, 311
gymnocephalus, Ambassis, 232
Gymnocheilops, **160**

Haemulon, 311
haje, Naja, 278
Halichoeres, 313
Halieutichthys, 314
hamiltonii, Thrissocles, 132
Hampala, 184
hanningtoni, Amauris, 370
    Argynnis, 373
hanseni, Hemimerus, 332
Hapsidophrys, 274
Harengula, 131, 309
harmandi, Barilius, 212
    Cosmochilus, 183
    Luciosoma 173
harrisi, Trichopsis, 222
hasta Pomadasys 235
Helicolenus, 300
Hemidactylus 281
Hemimerus, 331-335
Hemipimelodus, 144 145
Hemiramphus, 214 309
Hemiscyllium, 128
Hemisus, 295
Hemitripterus 302
Henotesia, 373
henryae Chrysophanus, **409**
Hepatus, 313
hepatus, Hepatus, 313
hesperus, Papilio, 381
Heterobagrus, 150
hexapterus, Kryptopterus, 137
heydeniana, Nauphoeta, 98
hiarbas, Eurytela 375
Hippocampus, 306, 310
hippomene Antanartia, 373
hippos, Caranx, 307, 310
hippurus, Coryphaena, 307
Hirundo 385
hispidus Stephanolepis, 308
hoevenii, Leptobarbus 174
hohnelii Chamaeleo, 289
holacanthus, Diodon 314
Holocentrus, 222 310
Holocerus 320
Homaloptera, 152
homeana, Kinixys, 269
horae Botia 154
horridum, Syancidium 244
hotamboeia Crotaphopeltis, 276
hova Procytettix **320**
hudsonius, Hippocampus, 306
hunti, Suggrundus, **244**
Huro, 307
Hydraethiops, 271
hymenophysa, Botia, 154
Hyperolius, 292 293
Hypoplectrus, 311
Hyporhamphus, 214
hypselosoma, Chirocentrus, 130

idonea, Nauphoeta, 98
Ilisha, 131
ilithyia, Byblia, 375
imbricatus, Dasyatis, 128
imerina, Cryptotettix, 320
immaculatus, Nina 380
    Tetrodon, 264
improba Brenthis, 402
indica, Anchoviella 131
    Illisha, 131
    Sciaena 242
    Scyris, 226
indicus, Opisthopterus 131
    Platycephalus 244
infida, Anapheis, 379
insidiator Secutor, 228
insularis, Leptysma, 355
interior, Amblytropidia 348
intermedius, Synodus, 309
Inusia, 355
invisa, Nauphoeta 87
Ioniscus, 106
irregularis, Atractaspis, 280
    Chlorophis, 273
islandi Seriola, 306
Istiophorus 224
Isurus 303

jacksoni Amaurus 370
jacksonii Thrasops, 274
jallae, Euandroblatta, 36
jamesoni, Dendraspis 270
jarbus, Terapon, 236
javanicus, Barbus 196
jello, Sphyraena 220
Jivarus, 353 354
jocu, Lutjanus 311
jodutta, Acraea 370
Johnius, 240 241
jolamarki Barbus 194
jucunda Agriacris 352
jullieni Cirrhinus 173
Junonia, 374
jussieu, Sardinella 130
jyekundensis, Petronia, **386**

kabaka, Euandroblatta **32**
kaimosae, Dendraspis, 279
kalla, Alepes 226
kammalensis Thrissocles, 131 132
kanagurta, Rastrelliger 224
kappas, Gerres, 238
kaznakoi Gymnocheilops, 160
keewaydin, Colias, 394
kemratensis, Clariasilurus, **183**
Kinixys 269
kirtlandii, Thelotornis, 277
kodiak, Lycaena, 411

koilomatodon, Prionobutis, 248
kootenai, Colias 393
kopsii, Ambassis 232
kraka Acraea, 372
Kryptopterus, 136

labdaca, Libythea 378
Labeo, 201-206
Lachnolaimus, 313
laciniata, Corica, 131
Lactarius, 226
lactarius, Lactarius 226
Lactista, 351
Lactophrys 314
laevigatus, Lagocephalus, 314
laevis, Barbichthys, 200
  Raja, 304
Lagocephalus 264 314
lanceolatus Eques 312
latreillei Tropidacris, 353
latus Caranx 310
lecontei Botia **156**
Leiocassis 150
Leiognathus, 228
Leiostomus, 307
leiura Strongylura 214
leiurus Tetrodon 264
leonidas, Papilio 382
Leptecheneis, 258
Leptobarbus 174
leptocheila Dangila, 176
leptolepis Selaroides 226
lepturus Trichiurus, 310
Leptopelis 291
Leptysma, 355
Lethrinus, 238
leuciscus Macilentichthys 228
Leucophaea, 50-62
leucostictus Pomacentrus, 313
Libythea, 378
limbatipennis, Oxyblepta 356
lima 309
linariaefolia Castilleja 423
lineata, Hapsidophrys 274
lineatus Boaedon, 271
  Bothropthalmus 271
lingua, Cynoglossus 216
lionotus Agama, 282
Lissochilus 188
Lobotes 307
longicornis, Staurorhectus, 349
Longiculter, **162**
longimanus Mugil, 220
longipenne Cornops 356
Lophius, 303
Lophobasileus, 385
Lophophidium, 303
Lophopsetta, 305
lormieri, Papilio 382
lortzingi, Belenois, 379
Lucania 305
lucas-bahi Botia, **154**
lucidula Aragoa, 431
lucifer, Holocerus, 320
Luciosoma, 173
lucius Channa, 224
lucretia, Pseudacrae, 376
lumpus Cyclopterus, 307
lunaris, Lagocephalus, 264
luteus Nemipterus, 238
Lutjanus, 235, 311
Lycaena 411-412
Lycophidion, 272
lycopodioides Aragoa, 431
Lycothrissa, 132

Mabuya 284-286
Macilentichythys, 226, 228
Macrochirichthys 167
macrochirus, Macrochirichthys 167
macrognathos, Colia 132
macrolepidota Hampala, 184
macrolepidotus, Cynoglossus 218
  Fundulus, 305
macrophthalma Harengula, 309
macrostomum Haemulon 311
macrurus Alepes 224
maculata Lophopsetta 305
  Sillago 238
maculatus Aulostomus 310
  Dormitator 314
  Pomadasys 235
  Pseudupeneus 313
  Scomberomorus 306
  Sphoeroides 308
maculilabris Mabuya 284
madecasse Nauphoeta 97
maderae Leucophaea 52 56
Magalaspis 224
majalis, Fundulus 305
Makaira 306
malabaricus Carangoides, 226
Malacanthus, 313
malcolmi Apocryptodon, 257
Mammoth 3-9
mancinus Erebia 397
mandanes Mycalesis 373
marginatus Abudefduf 313
  Mystacoleucus 176
marginipinnis, Cirrhinus, **178**
marina Bagre, 305
  Strongylura 305
mariposa, Chrysophanus, 409
marpessa, Neptis, 376
marshalli Euandroblatta 24 **46**
martinicus, Pseudupeneus, 313
masoni, Ctenogobius, 252
Mastacembelus, 222
masyae Nemacheilus, **158**
matabele, Euandroblatta, 24, **26**
mate, Alepes, 226
matensis Coscineuta, 356
maudae Cryptocentrus, **254**
maximus Lachnolaimus, 313
  Passer **385**
maxinae Homaloptera, **152**
mediocris Pomolobus, 304
Megalixalus 291
Megalops 128
Mehelya 272
meissneri Lophobasileus, **385**
mekongensis, Cyclocheilichthys **187**
Mekongina **200**
melanobrachium Johnius, 242
melanochir Setapinna, 132
melanogaster Hydroaethiops, 271
melanoleuca Naja, 278
melanopleurus, Osteochilus, 179
melanoptera Alepes, 224
melanopterus, Balantiocheilus 200
melanotaenia Tylognathus, 209
melanura Sardinella 130
melasoma Channa 224
melicerata Neptis, 376
Melitaea 403
Membras 306
Menidia 305
Menticirrhus 307
Meridacris **359**, 360
Merluccius 298 305
mesentina Anapheis 379
metella Neptis, 376
micracanthus Mystus, 146
microdon Pseudotriakis 303
Microgadus 305
microlepis Cynoglossus, 218
  Johnius 242
  Mycteroperca 298
  Trichopodus, 222
micronema Kryptopterus, 137
Micronotus 348
micropeltes Channa 224
Micropogon 307
micrurum Siacium 309
miniatus Peristedion 302
minima Leptysma, 355
Minotissa 351
minuta Gazza 230
minutus Propedes **366**
mitchilli, Anchoviella, 304
modesta Botia 156
modestus, Elapops, 278

Mola, 308
mola, Mola, 308
mombuttu, Nauphoeta, 71
Monacanthus, 262, 314
monoceros, Alutera 264
morio, Serranus, 311
Morone, 307
Morulius, 200
Mugil, 220, 305, 310
mulleri Xenopus, 289
Mulloidichthys, 238
multitaeniata, Amia 232
Muraena 305
Mustelus, 303
muticus, Trichiurus 224
Mycalesis, 373
Mycteroperca 298
Myliobatus, 304
Mylothris, 370
Myoxocephalus, 307
Mystacoleucus 176
mystax Thrissocles, 132
Mystus 146-148

Naja, 278 279
Namablatta, 17
nanus Parnassius, 392
nasicornis Bitis 280
nasutus Hyperolius 293
    Oncocephalus, 314
Natrix 271
naucrates Leptecheneis 258
Nauphoeta, 67-98
neglectus Hyporhamphus, 214
Nemacheilus, 156-158
Nemasiluroides 137 138
Nemipterus 238
nemurus Mystus 148
Neorohita 180
Nepheronia 380
Neptidopsis 375
Neptis, 376
nicholsi, Anthias 300
niger Parastromateus 226
    Plectorhinchus 235
nigricans, Makaira 306
    Pelusios, 269
nigriceps Mystus, 146
nigricollis, Naja 279
nigrofasciata, Limia 309
niloticus Varanus, 283
Nina 380
nireus Papilio 381
niavius Amauris, 370
notata Menidia 303
Notopterus, 130
notopterus, Notopterus, 130
nugax Stilpnoblatta, 106

obliqua, Abracris 356
obsoleta, Colpolopha 353
oblongus Gerres, 238
    Lagocephalus, 264
    Paralichthys, 298
obstii, Mabuya, 285
occidentalis Aragoa 429
    Nauphoeta, 82
    Pieris, 392
occipitalis Rana, 293
oceanicus, Gobius, 314
ocellaris Fundulus, 305
ocellata, Raja, 304
ocellatus, Parachaetodon, 246
    Tukagobius, 250
Ochotona, 341
ochrus, Osteochilus, 180
octodecimspinosus, Myoxocephalus 307
octofasciatus, Chaetodon, 246
Ocyurus 311
Odontoscion, 311
Oeneis, 397
oetus, Cercyonis, 396
oglinum Opisthonema, 309
oligactis Pseudogobiopsis, 251
oligolepis, Mugil, 220
Oligoplites, 306, 310
olivacea, Natrix, 270
olivaceus Boaedon, 272
Ompok, 134
Omura, 352
Oncocephalus 314
oniscinus Pseudoglomeris, 119 120
onitis, Tautoga 308
ophione, Neptidopsis, 375
Ophioscion, 311
Opisthonoma, 309
Opisthopterus 131
oppositus Monacanthus, 314
Opsanus 308
Opshomala, 355
oramin Siganus, 246
orbicularis, Platax, 246
Oreophilacris, 354
orientalis, Braclurus, 216
orina Acraea, 371
ornata Limia, 309
    Raja 297
    Rana, 293
    Terrapene 11
orphoides, Barbus, 192
Orphulella 349
Osmilia, 356
osseus, Johnius 240
Osteochilus 179-182
Otolithes, 240
oualensis Pempheris, 234
Oxyblepta, 356
oxycephalus, Triacanthus, 262
Oxyeleotris, 248
Oxygaster, 167
oxygastroides, Oxygaster, 167
oxyrhynchus Rana, 294
Oxytettix, 317

pachycentron, Sephalopholis, 234
Palinurichthys, 307
pallida, Pieris, 392
Panchax, 214
panchax, Panchax, 214
Panchlora, 63-65
Pangasius, 138-141
paphianus Charaxes, 378
Papilio, 381-383, 392
Parachaetodon 246
Paralichthys, 298 305
paramonis Oreophilacris, 354
Paraplagusia 216
Parastromateus, 226
Paratettix 348
Parelephas 11
Parexocoetus, 216
Parnassius, 392
pari Pomacanthus 313
    Seserinus, 310
parva Lucania, 305
parvum, Timotes, 368
pascoensis Phyciodes 404
Passer, 385
Paulinia 351
pectoralis, Morulius 200
    Trichopodus, 222
Pediella 358
Pelates 238
pellucida Gobiella, 248
peltatus Agis, 108, 118
Pelusios, 269
Pempheris, 234
peneleos Acraea, 371
penelope, Acraea 371
pennocki Gyrinocheilops, 161
Pentapodus 238
Perca 307
perciformis, Palinurichthys, 307
Peristedion, 302
perlonga, Leptysma, 355
perlucens, Appias, 378
perrotetii, Mabuya, 285
perspicua, Henotesia, 373
peruvianus, Allotettix, 347
pessuliferus Barbus, 196
petiverana Danais, 370
Petronia, 386
Petroscirtes, 258
Phaeoparia, 356
pharsalus, Acraea, 371
Phenacostethus, 219
Philothamnus, 273
phorcas, Papilio, 381
Phrynobatrachus, 295
Phycis, 298, 305
pictus, Plectorhinchus, 235
Pieris, 392
piscatorius, Lophius, 303
plagiusa, Symphurus, 309

planiceps, Mystus, 148
    Stilpnoblatta 103, 105
Platax, 246
Platycephalus, 244
Plectorhinchus, 235
pleurotaenius, Hyperolius, 292
Plotosus 133
plumbeus Eulamia 304
plumieri, Haemulon, 311
    Malacanthus, 313
poecilonotus Arthroleptis 295
Pogonias 307
Pogononemacheilus 158
policenes Papilio, 383
Polydactylus 220 310
Polygonia, 406-408
Pomacanthus, 313
Pomacentrus 313
Pomadasys, 235
Pomatomus, 307
Pomolobus 297, 304
Pomotis, 307
Poronotus, 298, 307
praeustus, Carangiodes, 226
pratensis, Scyllina 351
Priacanthus, 234 311
Prionobutis, 248
Prionodes 311
Prionotus, 302 307, 313
Pristolepis, 242
procera, Nauphoeta, 88
proctozysron Puntioplites, 198
Procytettix, 320
Pronauphoeta, 67
Propedies 366
propera, Euandroblatta, 25
Prosarthria, 348
prosemion, Osteochilus 183
Prosopodasys, 242
Prosymna, 275
Psammophis, 276, 277
Psettodes, 216
Pseudacraea, 376
Pseudobatrachus 260
Pseudoglomeris 119-121
Pseudogobiopsis 251
pseudo-harengus Pomolobus, 297, 304
Pseudopleuronectes 305
Pseudorhombus, 216
Pseudotriakis, 303
Pseudupeneus, 313
Pterois, 242
Pteropangasius 142, 144
puerilis, Leucophaea, 52, 58
pulcher, Danio 169
pulchripennis, Lactista, 351
pullus, Cantherines, 314
pulverulenta, Boiga, 276
punctata, Drepane 246
    Orphulella, 349
punctatus, Cephalopholis, 310
    Decapterus, 310
    Eques, 312
    Prionotus, 313
    Typhlops, 269
puncticeps, Cynoglossus, 219
punctifrons Sitalces, 356
punctulatus, Hippocampus, 310
    Psammophis, 277
    Trigonophymus, 357
Puntioplites, 198
pusillus, Agis, 108, 117
pustulata Minorissa 351
pygmaea Umbra 305
pygmaeus, Tylotettix 346
Pyrameis 374
pyramidata Andriana 320
Python, 270

quadracus Apeltes 306
quadricornis, Scorpaena 313
quadrimaculatus Pelates 238
quadrinasalis, Eremias 283
quirinalis Acraea 371

Rachycentron 226, 307
radiale Diplectrum 311
radiatus, Halichoeres 313
    Raja 297 304
Rana, 293, 294
rangatana Acraea 372
Rasbora, 167-169
Rastrelliger 224
regalis, Cynoscion, 300, 307
    Scomberomorus, 310
regius, Phycis, 305
regularis Bufo 290
reinhardtii Calabaria 270
reinholdi Cymothoe, 377
repasson Cyclocheilichthys, 186
resimus, Causus, 279
Rhinoptera, 304
rhodope Mylothris, 379
rhombeus Diapterus, 313
Rhomboplites, 311
Rhynchobdella 222
ridleyanus, Papilio, 382
rimator, Bathystoma 311
Riopa, 286, 287
riveroi, Culter, 166
rivulatus, Siganus, 246
robusta, Amia, 232
Roccus 307
rossii Hyperolius 292
rostrata, Muraena, 305
rostratus, Chelmo, 246
ruber, Cephalopholis 310
    Holocentrus, 222
    Otolithes 240
rubripinna Filirasbora, 172
rubrofasciata Basilarchia, 408
ruconius Secutor, 228
rusticus Polygonia, 407
Rypticus, 311

sabina Appias, 378
saepiolus, Lycaena, 412
safgha Ambassis 232
Salamis 375
saltatrix Pomatomus 307
sancti-petri Scomberoides, 224
sapidissima Alosa, 304
sardina Harengula, 309
Sardinella 130
satyrus Polygonia 406
Saurida 133
saurus Oligoplites 306 310
saxatilis Abudefduf 246
    Menticirrhus 307
    Roccus 307
scaber Dasypeltis, 275
    Grammoplites 244
scabricollis Agis, 107, 108
Scaphiophis 275
Scatophagus 246
sceleratus Lagocephalus 204
schaferi Charadrius, 340
scharica Mabuya 285
Schistocerca 357
schoepfii Chilomycterus 308
schubotzi Hyperolius, 292
schwanefeldi Thalassoma 248
Sciaena 242
Scoliodon 128
Scolopsis 236
Scomber 298 306
Scomberoides 224
Scomberomorus 224 306 310
scombrus, Scomber 298 306
Scorpaena 313
scriptus Aluterus 314
scutatus Centriscus 219
Scyllina 351
Scyris 226
sebae Python 270
Secutor 228
seeldrayersi Neptis, 376
seheli Mugil 220
Selar 224
Selaroides 226
Selene 307 310
selousi Euandroblatta 88
semivariegatus, Philothamnus 273
senegalensis Chamaeleo 287
    Terias 380
sequilabialis, Pangasius, 140
Seriola 306
Serranus 234, 310, 311
Sescrinus 310
sessor, Hemimerus, 333
setapinnis, Vomer, 310
setifer Gerres, 238
Setipinna, 132

setirostris, Thrissocles, 132
setosus Pentapodus 238
sexcauda, Nemacheilus, **156**
sexfasciatus, Caranx, 226
sextarius Polydactylus 220
siahi, Longiculter, **162**
siamensis Catlacarpio, 179
  Chanda, **230**
  Cultur, 163
  Dangila, 177
  Dermogenys, 214
sibilans Psammophis 276
Siganus, 246
sihama, Sillago 239
silacea, Nauphoeta, **98**
Sillago 238
sina, Johnius 240
Sitalces 356 357
sjostedti Ioniscus 107
slateri, Enulius 417
smaragdina Gastropyxis, 274
smithi, Scyllina, 351
smythii, Grayia 274
soldado Johnius, 240
sordidus, Abudefduf 248
Sparisoma, 314
spengleri, Sphoeroides, 314
Sphoeroides, 308 314
Sphyraena 220, 310
Sphyrna, 304
spilopleura, Vaimosa 252
spilopterus, Barbus, 188
splendens Leiognathus 228
Squalus, 297, 304
squamigera, Atheris 280
stanleyana, Panchlora 64
Staurorhectus, 349
stellatus, Astrapogon 310
Stellifer, 311
Stenotomus, 300, 307
Stephanolepis, 262, 308
stigmabrachium Culter, 166
stigmapleura Labeo, **202**
Stilpnoblatta, 101-105
stolata Panchlora 65
striata Channa, 222
  Mabuya, 286
striatus Centropristis 307
  Centropristis 300
  Serranus, 310
strigata, Neptis, 376
strigatus, Prionotus, 307
strigilifer, Triacanthus, 262
Strongylura 214, 305
stygia Precis, 374
subaptera Meridacris **360**
sudanensis, Nauphoeta 97
Suggrundus 244
sulphureus Upaneus, 238
sundevallii Riopa, 287
superciliaris Bufo 289
surinama, Eumastax 348
surinamensis, Lobotes 307
sutchi, Pangasius, 141
Syacium 309
Symphurus, 309
synagris Lutjanus, 311
Synancidium, 244
Syngnathus, 219, 306
Synodus 309

tabacaria, Fistularia, 309
tabacarius Prionodes, 311
Tachysurus, 144
taeniatops, Garra, 211
Taenioides, 257
tamasica, Chonophorus, 314
talpoides Hemimerus, 335
tatumi, Osteochilus, **180**
taty, Setipinna, 132
tau, Opsanus, 308
taurus, Carcharias, 303
Tautoga, 308
Tautogolabrus, 303
tayenus, Priacanthus, 234
taygete, Oeneis, 397
temora, Salamis, 375
temporalis, Scolopsis, 236
tenuis, Phycis, 298
Terapon, 236
terea, Precis, 374
teretrirostris, Prosarthria, 348
Terias 380 381
terpsichore, Acraea, 372
Terrapene, 11
testacea Nauphoeta, 96
testudineus Anabas 222
tetradactylum Eleutheronema, 220
Tetrodon 264
thai Nemacheilus 156
  Phenacostethus, **219**
  Thynnichthys, **177**
thalassina Nepheronia, 380
Thalassoma, 248, 313
thelmae Helicolenus, **300**
Thelotornis, 277
theora, Belenois, 379
theraps, Terapon, 236
theuszi, Belenois, 379
thoracica, Leucophaea, 52, 53
thoricata, Kowala, 130
Thrasops, 274
Thrissocles, 131
Thunnus 306
Thymiochares, 323-326
Thynnichthys, **177**
thynnus, Thunnus, 306
tibetana, Hirundo, **335**
tigris Antennarius, 314
  Isurus, 303
Timotes **363-365**
tolypeutes, Pseudoglomeris, 119 120
tomcod Microgadus, 305
Toxotes, 246
Trachinotus, 226, 307, 310
trachycephalus Johnius, 240
tragula, Upeneus, 238
Triacanthus, 262
triacanthus Poronotus, 307
Trichiurus, 224 310
Trichopodus 222
trichopterus, Trichopodus, 222
tricornis, Lactophrys, 314
trifasciatus, Pomadasys, **235**
Trigonophymus, 357
trinitatis Amblytropidia, 348
  Sitalces, 357
triqueter, Lactophrys, 314
tropicalis, Xenopus 289
Tropidacris, 353
Tropinotus, 352
troscheli, Mugil, 220
truncatus Amblyrhynchichthys, 174
Trypauchen, 257
Tukagobius, 250
tumbil, Saurida, 133
Tylognathus, 208-210
Tylotettix, 346
tynderaeus, Papilio, 382
Typhlops, 269
typus, Culter 164
  Dispholidus, 277
tyrannus, Brevoortia, 304

ucalegon, Papilio, 382
ucalegonides Papilio, 383
uganda, Euphaedra, 377
Umbra, 305
undecimalis Centropomus, 310
undulatus, Micropogon, 307
unicolor Hypoplectrus, 311
unimaculatus, Archosargus, 311
Upeneus 238
urotaenia, Ambassis, 230
ustus Crytotomus, 313

vagina, Trypauchen, 257
vagrans, Membras, 306
vaigiensis, Mugil, 220
Vaimosa, 251, 252
valenciennei, Atherina, 220
Varanus, 282, 283
varia, Mabuya, 286
Varicorhinus, 188
variegatus, Cyprinodon, 305
venusta, Rana, 294
vesperalis, Acraea, 371
vexillifer, Ctenogobius, **252**
vicinus, Hemimerus, 333
Vilerna, 356
virginicus, Anisotremus, 311
  Polydactylus, 310
viridipunctatus, Ctenogobius, 252
viridula, Pronphoeta, 67
vitta Lutjanus, 235

vittatus, Bufo 291
    Mystus 146
    Osteochilus, 180
    Trichopsis, 222
volitans Pterois, 242
Vomer, 310
vomer, Selene, 307, 310
vosmeri Scolopsis, 236
vosseleri, Panchlora, 64
vulpes, Albula 304

walbeehmi Scoliodon 128
Wallago 133
waltoni, Nemacheilus, 157
washingtonia, Argynnis, 399
wehrlei, Cryptocentrus, 256
wolfi Culter, 168
wolffi, Acanthoperca 230
    Mystus, 148
woodwardi, Ophioscion, 311

xanthochlora Oxyblepta 356
xanthozona, Brachygobius, 248
xanthurus Leiostomus 307
Xenentodon 214
Xenocheilichthys, 174
Xenopus 289
Xiphias, 306

Ypthima, 373

zalmoxis Papilio 381
zebra Zebrias 216
Zebrias, 216
Zenarchopterus 214
Zenopsis 298
zoe, Terias, 381
zonata, Seriola 306
zygaena, Sphyrna 304

GENERAL INDEX

1937

Abstracts of the Minutes of the Proceedings, 433

Allen Glover H Second Preliminary Report on the Results of the Second Dolan Expedition to West China and Tibet A New Race of Ochotona, 341

Cadbury, John W 3rd Lepidoptera Collected in Northern British Columbia by Miss Josephine de N Henry Part I,—Rhopalocera, 387

Committee on the 1937 Leidy Medal, 449

Cotter John Lambert The Occurrence of Flints and Extinct Animals in Pluvial Deposits near Clovis, New Mexico Part IV—Report on Excavation at the Gravel Pit 1936 1

Cresson Ezra T, Jr Zoological Results of the George Vanderbilt African Expedition of 1934 Part VIII,—Lepidoptera Rhopalocera, 369

Deaths Announced 437

De Schauensee Rodolphe Meyer First Preliminary Report on the Results of the Second Dolan Expedition to West China and Tibet Two New Birds from Tibet 339 On a New Species of Drongo from Siam 337

Dunn Emmett Reid The Snake Genus Enulius Cope 415

Fowler Henry W A Collection of Haytian Fishes Obtained by Mr Stanley Woodward 309 Notes on Fishes from the Gulf Stream and the New Jersey Coast 297 Zoological Results of the Third De Schauensee Siamese Expedition Part VIII,—Fishes Obtained in 1936, 125

Joseph Leidy Medal,—Fifth Award, 449

Linton, Edward Joseph Leidy Medal 449

Loveridge, Arthur Zoological Results of the George Vanderbilt African Expedition of 1934 Part VII,—Reptiles and Amphibians, 265

Members Elected, 435

Minutes of the International Symposium on Early Man, 439

Officers Elected, 450

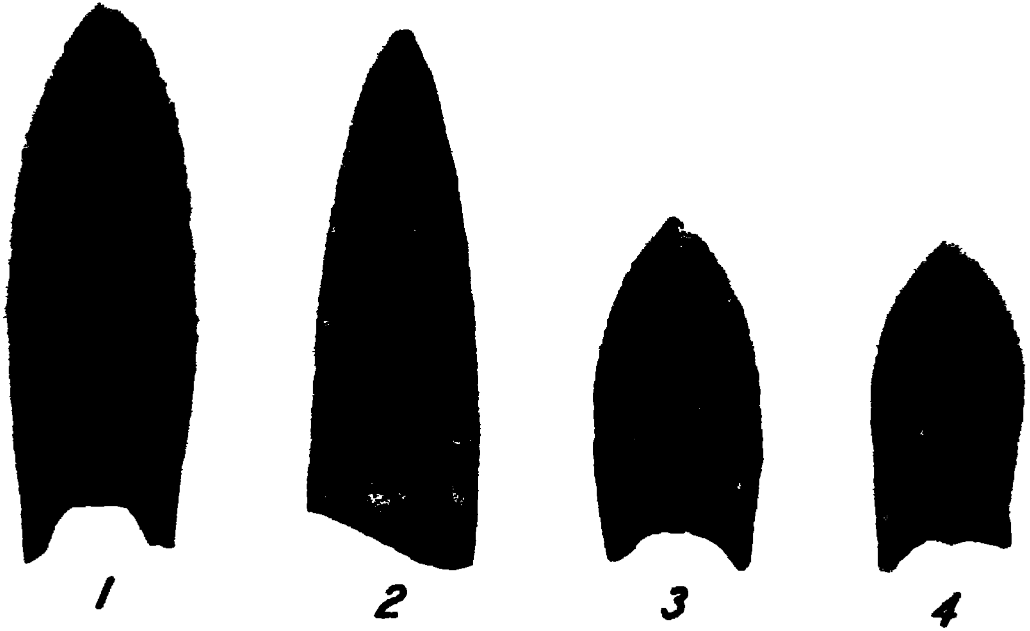
Pennell, Francis W Castilleja in the Charleston Mountains, Nevada, 419 Taxonomy and Distribution of Aragoa, and its Bearing on the Geological History of the Northern Andes 425

Rehn, James A G African and Malagasy Blattidae (Orthoptera),—Part III, 17 A Second Study of New and Little-known Madagascar Grouse-locusts (Orthoptera, Acrididae Acrydinae) with a Key to the Species of Thymochares, 317

Rehn, James A G and John W H Rehn Further Notes on the Genus Hemimerus (Dermaptera, Hemimerina, Hemimeridae), 331

Roberts, H Radclyffe Studies on the Family Acrididae (Orthoptera) of Venezuela 343

Schafer Ernst Third Preliminary Report on the Results of the Second Dolan Expedition to West China and Tibet Four New Birds from Tibet 385



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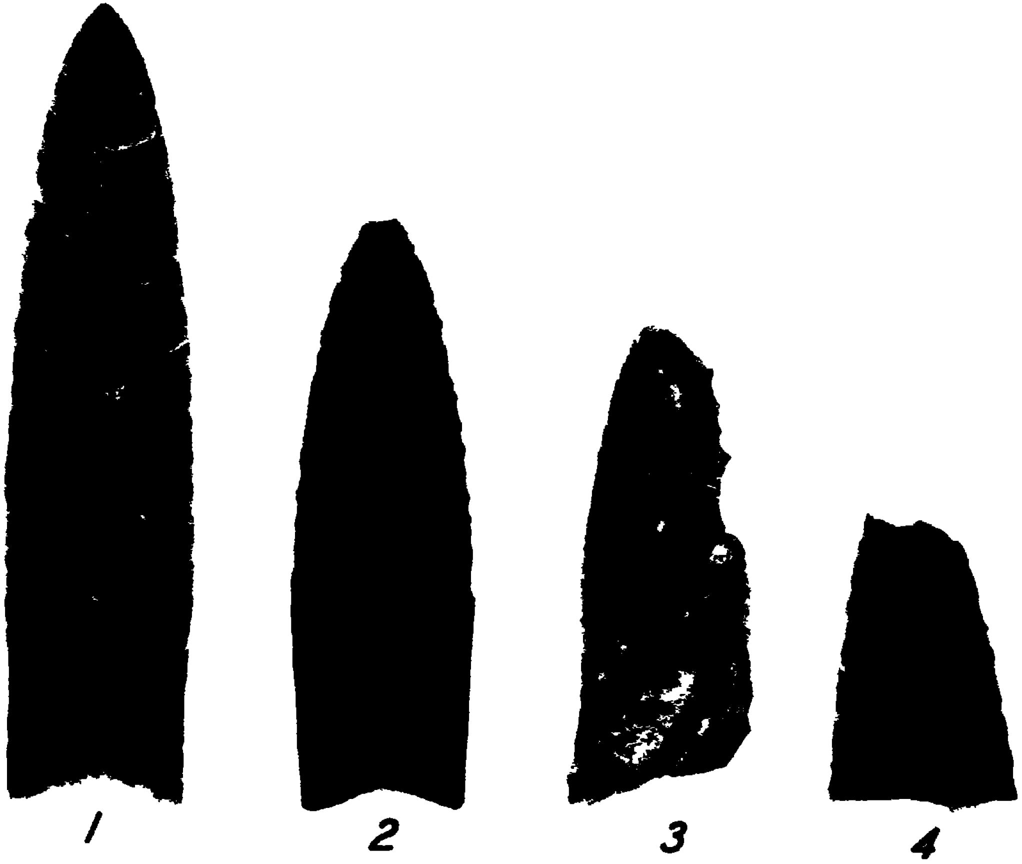

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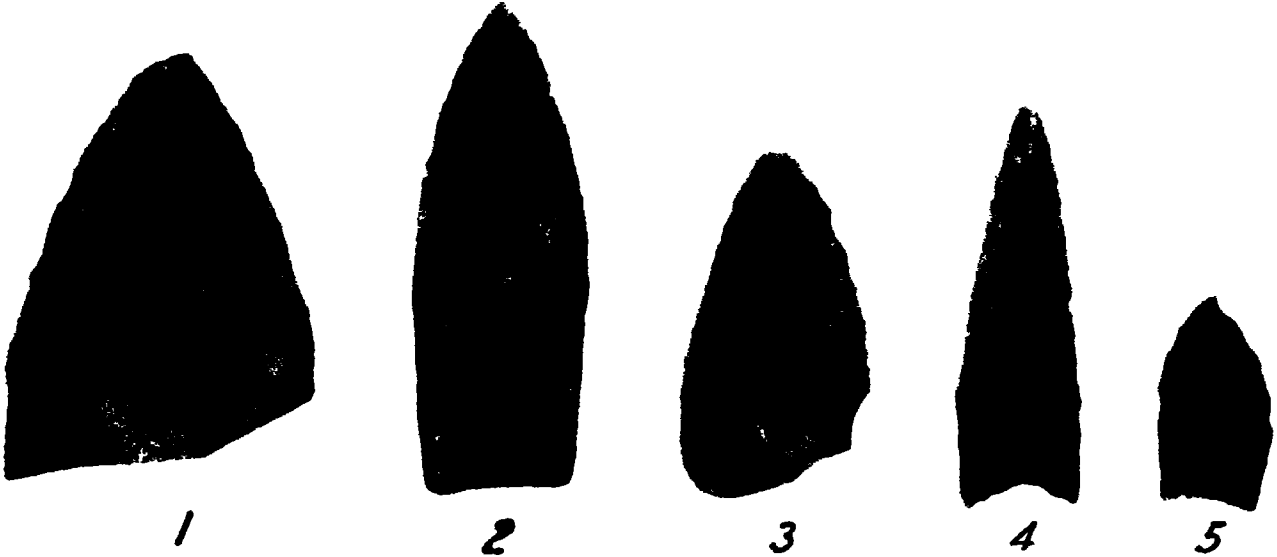

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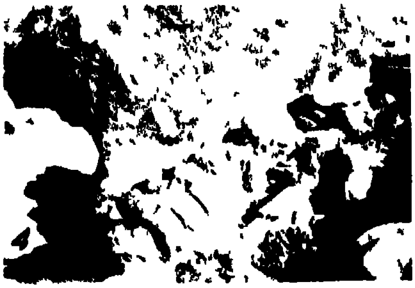

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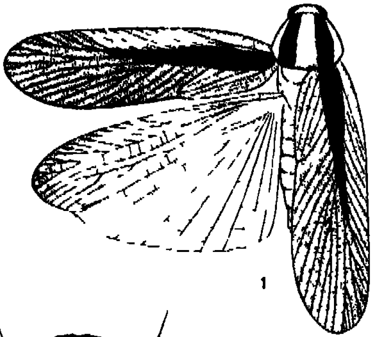

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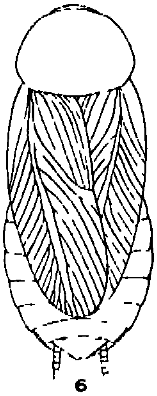

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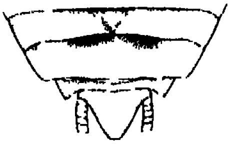
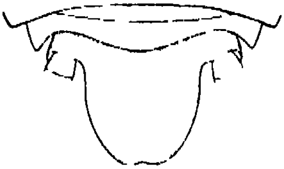
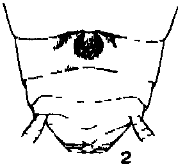


7



11



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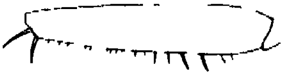

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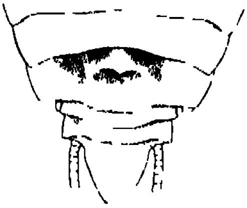
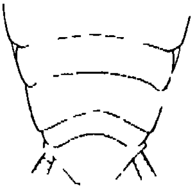


14



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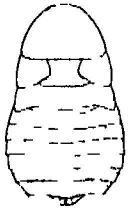

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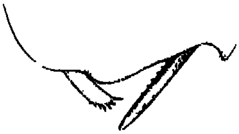
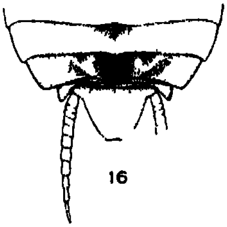
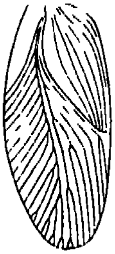


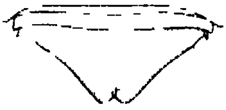
8



16



9



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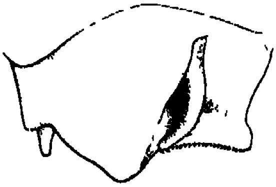
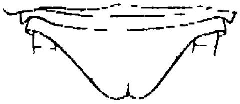
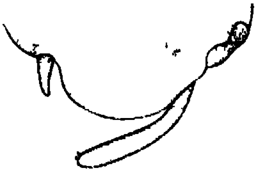


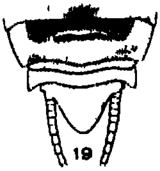
15



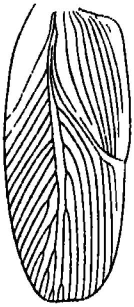
13



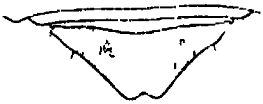
17



19



12



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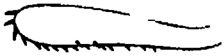
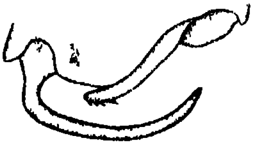
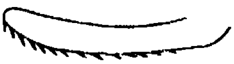


18

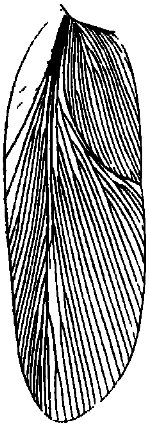


20



21

REHN AFRICAN AND MALAGASY BLATTIDAE (ORTHOPTERA),—PART III



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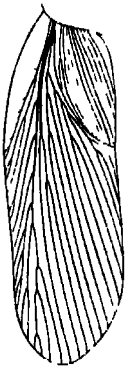
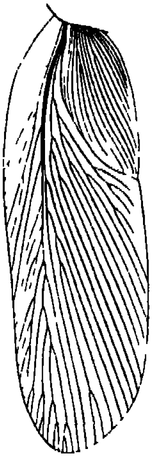
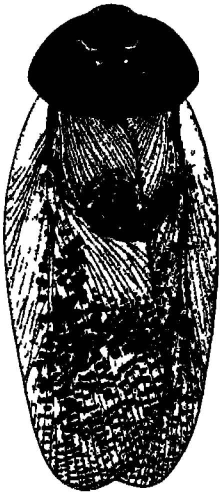


26



28



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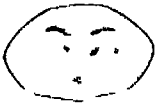

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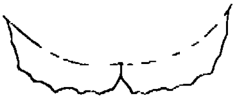

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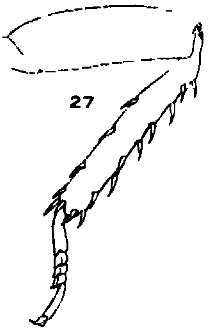

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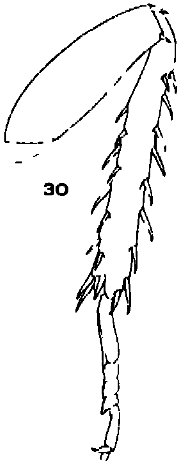

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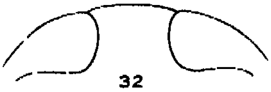
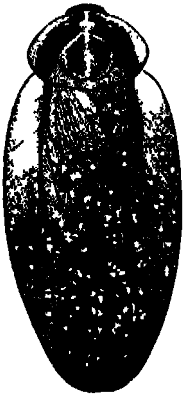


32



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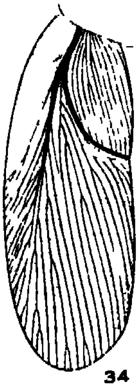

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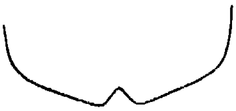
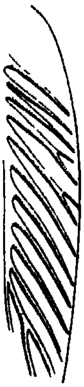


35



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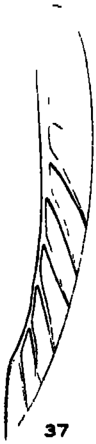

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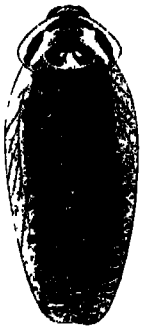

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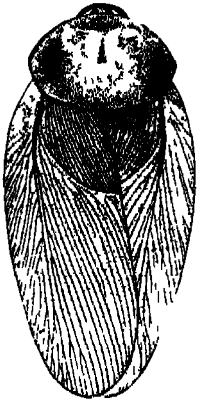
REHN AFRICAN AND MALAGASY BLATTIDAE (ORTHOPTERA),—PART III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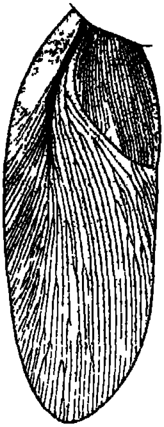
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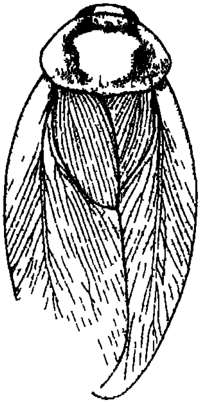
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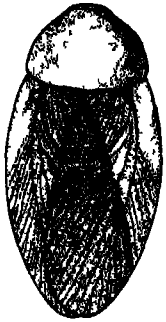
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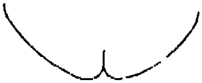
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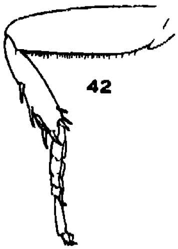
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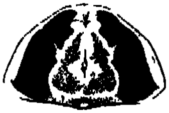
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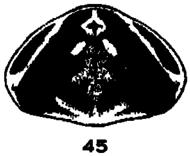
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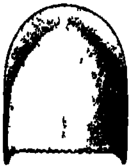
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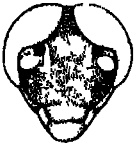
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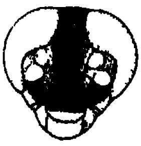
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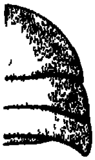
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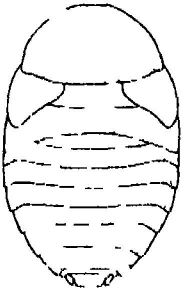
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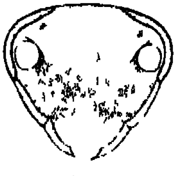
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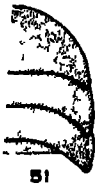
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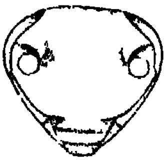
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54

REHN. AFRICAN AND MALAGASY BLATTIDAE (ORTHOPTERA),—PART III

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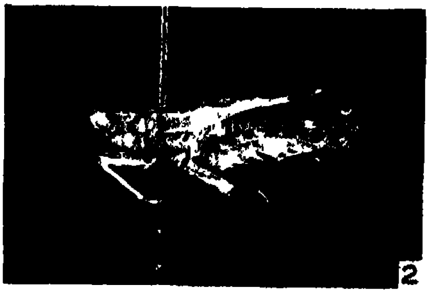
64

REHN AFRICAN AND MALAGASY BLATTIDAE (ORTHOPTERA),—PART III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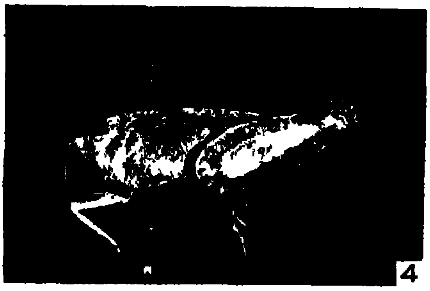
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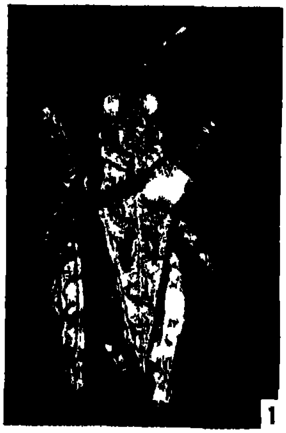
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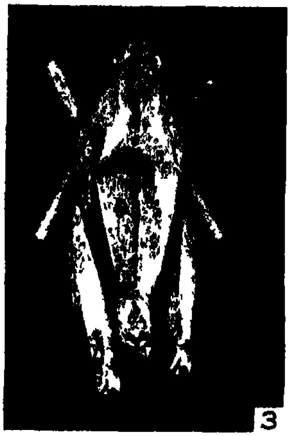
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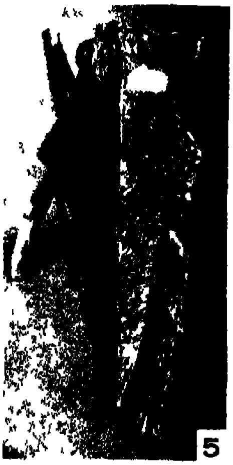
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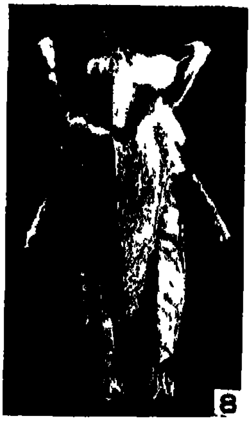
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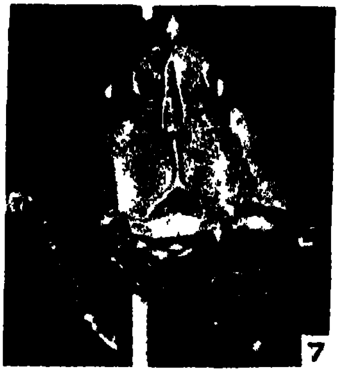
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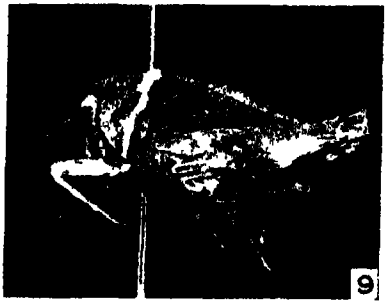
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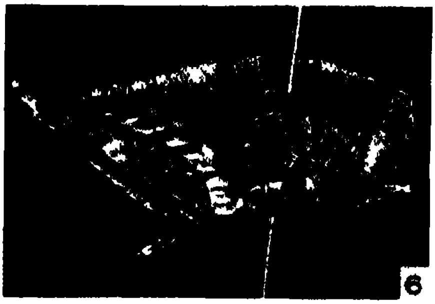
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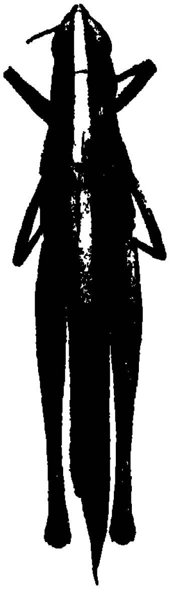
REHN SECOND STUDY OF NEW AND LITTLE-KNOWN MADAGASCAR GROUSE LOCUSTS



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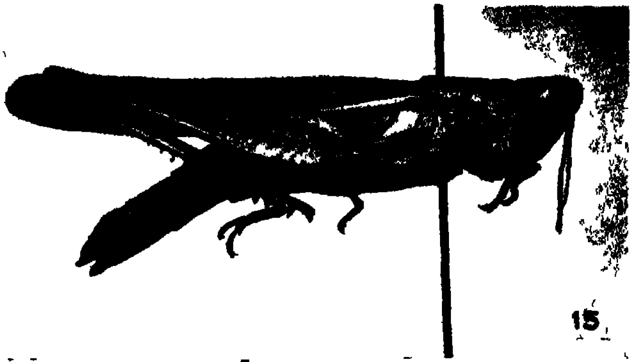

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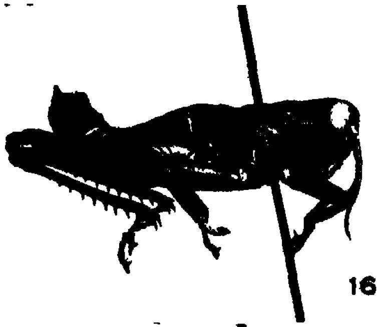

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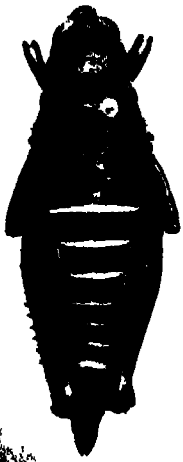

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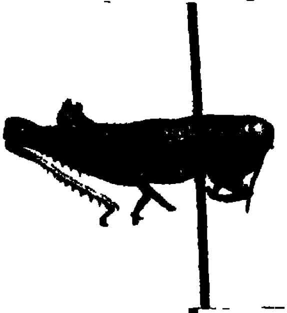

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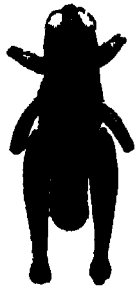

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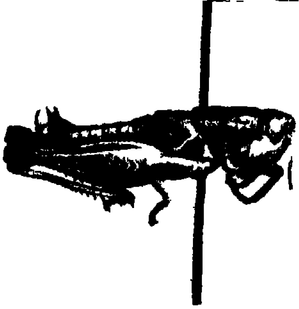

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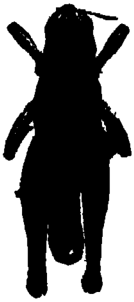
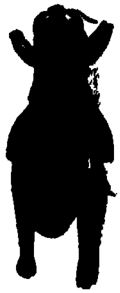


21

ROBERTS STUDIES ON THE FAMILY ACRIDIDAE (ORTHOPTERA) OF VENEZUELA



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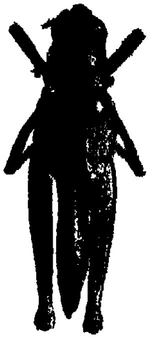

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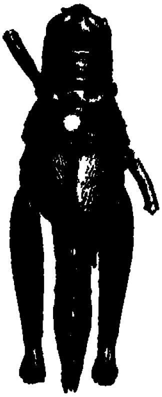

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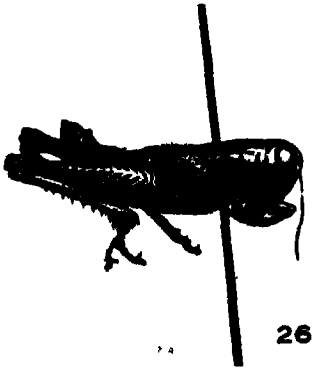

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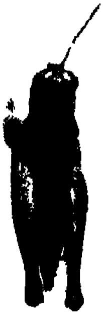

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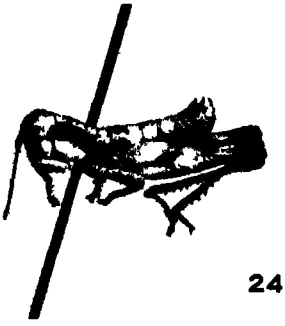

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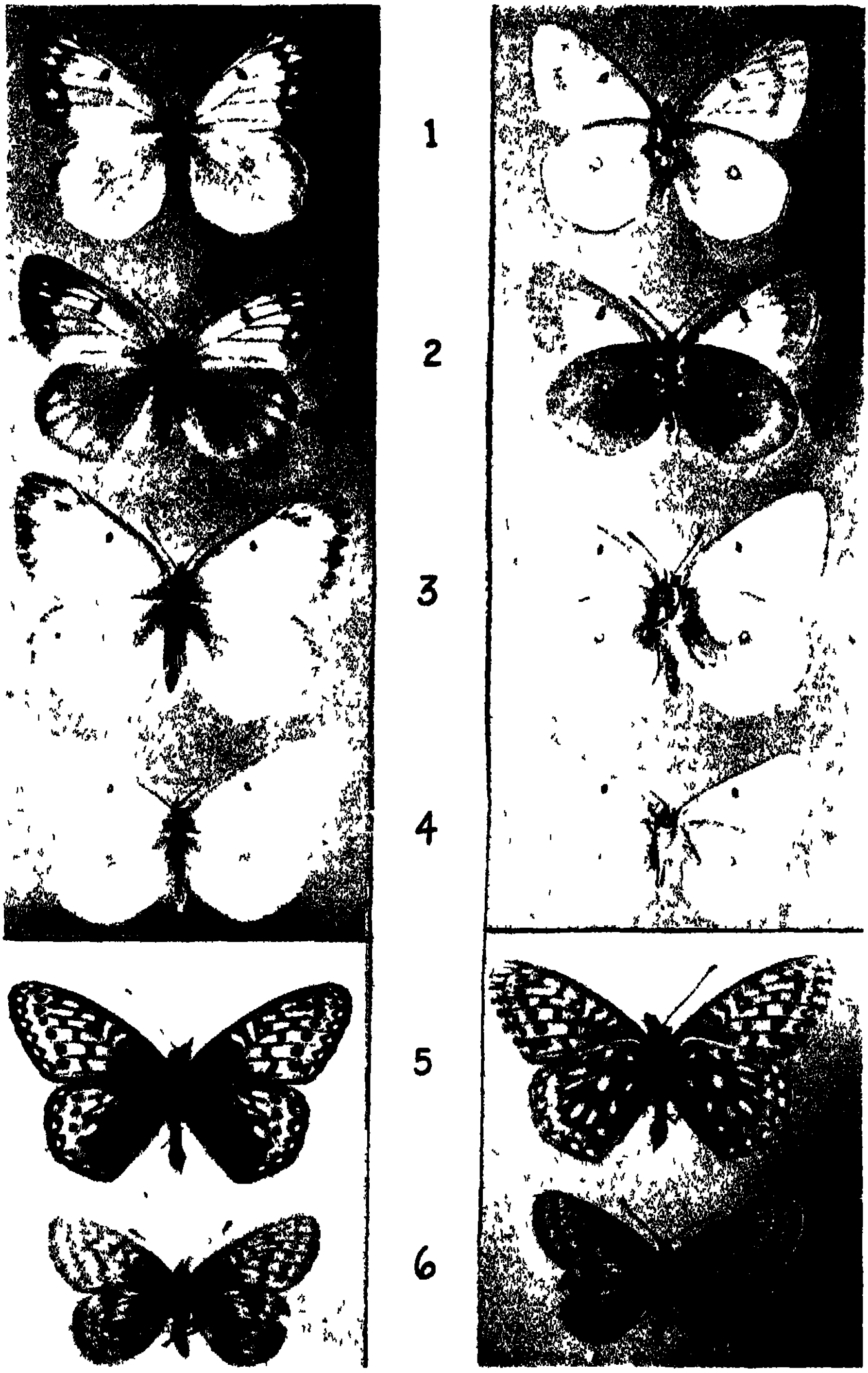
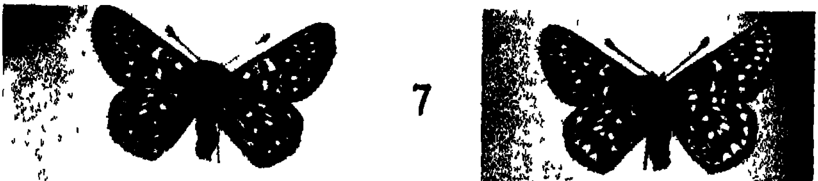


CADBURY LEPIDOPTERA COLLECTED IN NORTHERN BRITISH COLUMBIA, PART I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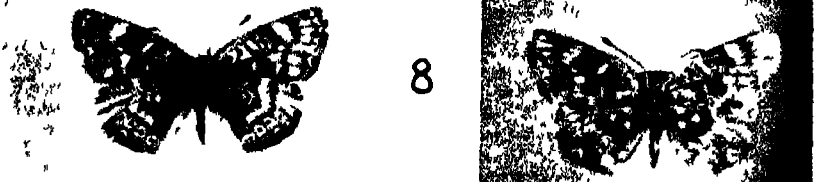
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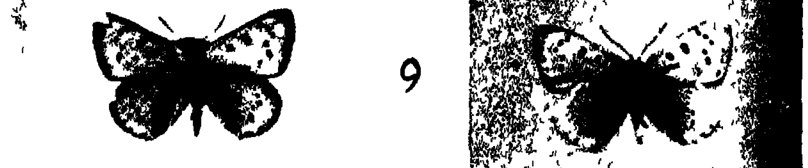
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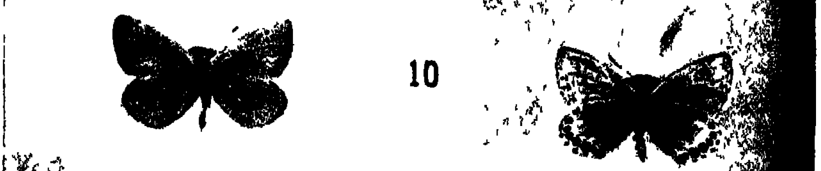
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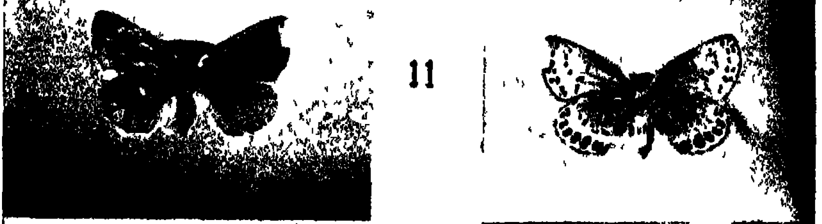
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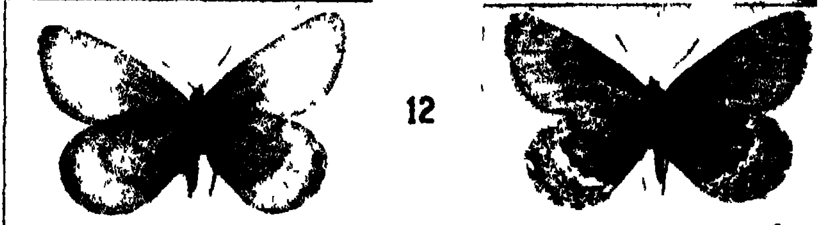
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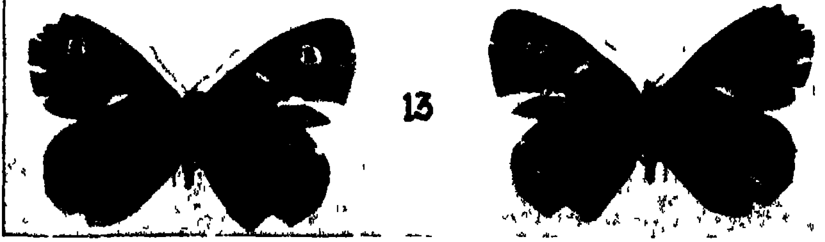
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CADBURY LEPIDOPTERA COLLECTED IN NORTHERN BRITISH COLUMBIA

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